**Chapter 1**

**Changes in the Nature of Warfare**

On Saturday 6th October 1973, on the afternoon of the Yom Kippur fast day, the Arab armies – primarily the Egyptian and Syrian armies – launched an offensive against the State of Israel. The operation included ground, aerial and naval maneuvers, incursions into the territory of the State of Israel, and a fierce battle with the IDF. The attacking armies were sent by their sovereign governments, who had chosen to implement their national policies through military action. On that day and during the month that followed, the IDF and the Arab armies engaged in difficult warfare, whose military characteristics were similar to the wars that the State of Israel had previously fought. This involved warfare between state armies fighting in a regular manner; warfare over defined territories – primarily in the border areas; warfare, that at least in the tactical sense, could end in a clear and decisive defeat of one side – for example the destruction or surrender of a force, or an inability or a lack of desire of the force to continue to fight; warfare that primarily took place on the battlefield under the thunder of cannons; and for the most part with a direct connection between the tactical outcomes on the battlefield and the strategic outcomes of the war.

In contrast to this war, the conflicts that the State of Israel has experienced in recent decades have been different. These conflicts, mostly, do not begin at a particular moment, but rather they take place over time. They are characterized by: periods of escalation and periods of calm, and they possibly will never end; direct clashes do indeed take place in the border areas, but fire on the home front now covers broad areas of the State of Israel, and blurs the classical distinction between the front and rear; the warfare is not only between regular armies, but rather between the IDF and organizations that take varied forms – armies, semi-military organizations, civil organizations, etc.; the combat has a broad strategic impact, it is broadcast globally, and as such challenges Israel in many senses – in terms of foreign relations, internal politics, and economic aspect etc.; it also influences additional areas and is influenced by them; and in addition to all this – the warfare generally does not end with a clear and decisive defeat or a clear agreement, it often reaches the point where both sides claim victory.

Alongside the many differences, there are also quite a few parallels between the conflicts, starting with the experience of the soldiers and commanders on the battlefield – the combat and fear of death, the heroism of face-to-face combat with the enemy – and includes the fact that war is a violent expression of policy, whose purpose is to bring the required diplomatic results through military tools.

The uniqueness of these changes is not necessarily that they are new, given that with the global historical phenomenon of war, it is difficult to create something completely new. Many phenomena that appear to be new, such as the blurring of the front and rear, are old phenomena that have merely taken on a different form. The uniqueness of these changes in war is in their large number and their significance, that is, these changes are not a short-term temporary phenomenon, but are numerous, noticeable and have great influence on the act of war. Consequently, it is worth deepening our understanding of these changes, to elicit their significance for the policy of the State of Israel and its potential for success.

This chapter will describe these changes in the nature of conflict, from a broad global perspective and a historical viewpoint focused on the State of Israel and the conflict between Jews and Arabs. Given that war is an ancient and global human phenomenon, in order to understand the changes we need to analyze it from several angles, each one of which will provide only a limited prospective, but together they enable a deeper understanding of the changes. Throughout this chapter we will propose three historical perspectives: the first is the development of technologies during the Industrial Revolution, and their influence on the act of war; the second analyses three distinct time periods of Jewish-Arab relations in our area, from the beginning of Zionism till today; the third describes the mass introduction of precision weapons to warfare, and the influence of this development on the act of war. Additionally, we will analyze the increased prevalence of warfare in urban environments and its implications. The combination of these perspectives enables a better understanding of the phenomenon of war as it has developed in our time and enables a better understanding of the existing problems within it.

**The Four Industrial Revolutions – the First Historical Survey**

It is customary to describe the history of the technological progress of mankind through the large revolutions that drove humanity forward, those that have changed the world to make it unrecognizable. For example, it is customary to talk about the agricultural revolution, that led humanity from a nomadic lifestyle as hunter-gatherers to a lifestyle of settled agrarian societies; about the Industrial Revolution, which transformed the world from a lifestyle based on an agrarian economy to a lifestyle based on industry and machines; and today we are talking about the information revolution, that we are experiencing today.

A closer review of history shows that these revolutions were not made up of individual events, after which the world was different to that which had existed before, but rather a series of continuous developments that took place over a clear period of time, and only after which it was possible to see that the world had indeed undergone a revolution. During each period of time, multiple developments and secondary revolutions took place, each of which contributed to a larger revolution. For example, we speak about the first and second agricultural revolutions, which took place with gaps of hundreds and thousands of years across the globe, and each one of which changed humanity in a certain way, and together they shaped the world in such a way that can be described as “the world after the agricultural revolution.” Similarly, the industrial revolution is comprised of four secondary revolutions, which we will described below, each one of which changed the world in a certain way.

Given that this book deals with the phenomenon of war and its implications, the analysis below will focus on the technological nuclei of these secondary revolutions, and their implications for the act of war, through each of the combat dimensions. That is, for each of the four industrial revolutions, the revolution will be described from an industrial-technological perspective, and its implications will be described in detail for each combat dimension: ground, aerial, space, naval and information.[[1]](#footnote-1) The combat dimensions are a theoretical tool that can help us describe and understand the phenomenon of war, by describing the primary spaces and environments in which war takes place.

The ground dimension encompasses combat that takes place on the ground, underground or at an altitude close to the ground, whether involving people or various machines. The ground combat dimension has the most ancient history, and for most people this is the most familiar and well-known phenomenon of war – a physical clash between people and vehicles on the ground. The ground dimension also includes damage to the ground from the air or the sea, such as for example aerial or naval bombardment, and of course surface to surface fire.

The naval combat dimension encompasses combat between people and vessels on the surface of the sea, underwater or at an altitude close to sea level. This is a ‘younger’ dimension than the ground dimension, as humanity only began to fight at sea after developing the capability to travel by sea. Naval combat includes clashes between various naval vessels, whether above the water or below it, for example, with the use of submarines.

The aerial dimension encompasses combat in the air, that is between aircraft that are intended to destroy one another, and the space dimension includes combat in space, between people and vehicles in space. The aerial and space dimensions are relatively new dimensions in the phenomenon of war – combat in the aerial dimension began to develop at the beginning of the 20th century, while combat in space is only a few decades old.

The information dimension encompasses combat that uses information, that is all actions that are undertaken to plant false information amongst an adversary, and to deny them accurate information, as well as obtaining accurate information and preventing the acquisition of inaccurate information. The primary purpose of combat in the information dimension is to mislead the decision-makers or computerized systems of the other side, to lead them to make incorrect decisions, or from our perspective, the right decisions. Combat in this dimension is highly varied, and it is customary to include cyber warfare, intelligence gathering, psychological warfare, deception operations, information operations, lawfare and economic warfare, etc. Combat in the information dimension is combined and integrated with the combat in all the other dimensions, and consequently, all warfare in every dimension also includes an information dimension within it. Given that the information dimension includes so many sub-fields, we will use the term information dimension in our survey below primarily to describe the transmission of information between people fulfilling different roles as well as cyber warfare, and the other elements will be described in other contexts.

Furthermore, the information dimension crosses all the dimensions, and indeed warfare today, certainly in the IDF and other western armies, integrates several dimensions in every action. For example, action in the ground dimension is supported by platforms working in the naval, aerial and space dimensions, and on the other hand, actions in the ground dimension are directed towards the air and sea, such as, for example, actions against aircraft, surface vessels and submarines. Likewise, most armies are divided into different services which work in the different combat dimensions and given that warfare is generally conducted in multiple dimensions, it is customary to work using a joint cross-service approach.

This survey will show how the secondary revolutions of the Industrial Revolution’s (hereinafter the revolutions) instigated changes in the combat dimensions, and how warfare has been shaped over the last few hundred years, as a result of the changes undergone by humanity in these areas.

**The 2nd Industrial Revolution**

Fusion between machines & electricity enabled the division of labour and mass production

First abattoir production line 1870

**The 4th Industrial Revolution**

Fusion between the cyber world & physical machines

A separate digital realm that constitutes an independent platform for production

**The 3rd Industrial Revolution**

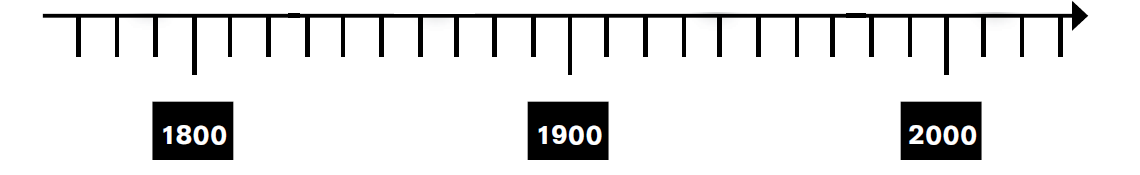
Fusion between electricity & computers enabled the automation of the production line

First processor that could be programmed for different purposes 1969

**The 1st Industrial Revolution**

Fusion between steam & machines enabled continuous production

First Spinning Jenny 1764



The above diagram and the analysis below describe the four revolutions as if they were closed mechanical processes, that began at a set moment and finished at a later moment. However, in reality these were much more complex processes, and between each of the revolutions there were interspersed periods of ‘wave interference’. Only through long-term historical analysis can we discern the different trends that developed over time.

**The First Industrial Revolution**

From the middle of the 18th century, technological, social and economic changes began to develop in Europe and the United States, changes that have been termed “the first wave of the Industrial Revolution.” The essence of this revolution was the replacement of agriculture and an agrarian economy with an economy based on mechanization and industrialization, namely, the introduction of machines as the foundations of the economic structure of society.

The exploitation of coal and the invention of the steam engine developed a new type of energy and utilization of energy, which underpinned the acceleration of the modern economy, and brought it closer to that which we know today. The steam engine enabled fast train transport on land and large marine vessels at sea; the ability to create and shape steel in large quantities and to utilize it for different purposes; the ability to power varied industrial machines through the use of steam engines, which for the first time were not dependent on the muscle power of humans or animals – all of these enabled industry and human action of a greater magnitude and quality than ever before. These developments gradually changed humanity, its economy and social structure. This enabled humanity to be reshaped, which was reflected in the first factories and first industrialized cities that began to be built as a result of the revolution, and which were the primary shapers of the factories and cities that we are familiar with today.

The Industrial Revolution, with all its inventions, was enabled through a variety of research and economic investment and through the organized production capacities that the research created. This research was based on economic, industrial, and organizational theories and models, such as those devised by Frederick Winslow Taylor and Henry Ford, and that led to the establishment of large factories and large industrialized cities in Europe and the United States.

The first stage of the Industrial Revolution, which we will refer to as the first Industrial Revolution, brought modern firearms and standardized ammunition to the world of war. These were mass manufactured and enabled the development of massive armies composed of soldiers in the ground dimension: infantry armed with firearms and supported by standardized and uniform logistics which were also based on the Industrial Revolution. The revolution also brought steamships to the naval combat dimension, which were built using consistent designs, and armed with standardized weapons.

We can describe this military revolution as the industrialization of warfare in the ground and naval combat dimensions. Industrialization in this context meant a significant increase in the number of platforms on the battlefield, and the systematic approach and regulation of their manufacture and use. That is, the revolution brought about the industrialization of warfare on the ground by bringing to the battlefield not only a few weapons for ‘boutique’ use, but rather masses of weapons. Furthermore, these masses of weapons – their design, manufacture, transport, definition of standards for use (combat doctrine and combat tactics), training on how to use them, support systems for repair and improvements, and even the planning of their retirement and replacement with new weapons - all of these actions can be described as the industrialization of warfare in the relevant dimension.

The wars that best illustrate these revolutions are the Napoleonic Wars, which made sophisticated use of industrialization to recruit, arm and motivate mass armies. This mass recruitment and armament were made possible due to the mechanized production of weapons and ammunition, and the preservation of food in a massive and industrialized manner. Rapid mobility was enabled by the steam trains and steel train tracks that crisscrossed large sections of Europe. The Industrial Revolution contributed a breakthrough to the world of war that enabled the industrialization of the ground and naval combat dimensions, by harnessing the new mechanization processes for mobility on land and at sea, and the mass production of standardized weapons.

**The Second Industrial Revolution**

Approximately a century later, prior to the end of the 19th century, steam began to give way as a technological innovation to electricity, the internal combustion engine and petroleum. These developments were harnessed by industry in general, and they had a dramatic impact on physical mobility and the mobility of information – a field that was not affected by the first revolution. This second revolution is thought of to this day as the classical Industrial Revolution, with numerous workers working on an endless production line, working in industrialized cities, grey and smoky. Perhaps most dramatically, this revolution was portrayed in the 1938 Charlie Chaplin movie “Modern Times”, and even if it’s filming took place several decades later, it provided a graphic description of the experience of a worker on a production line that was designed and controlled almost completely mechanically and not by humans.

In the field of physical mobility, the combustion engine enabled engines to become much smaller and more efficient, and in so doing to significantly expand mobility on land and at sea – in cars and ships – and to add aerial mobility and even to begin to dream about mobility in space. These factors made a significant contribution to reducing time and distance, and thereby enabled the transportation of greater numbers of people and materials from place to place, and for this to be achieved much faster.

In the information field, prior to this revolution information was communicated over long distances by messengers, and over shorter distances on the battlefield through flag signaling, the playing of drums and trumpets and other various methods. The invention of electricity enabled the building of the telegraph, telephone and wireless that made human communication faster than ever before.

The military implications of this revolution came in the form of tanks and armored vehicles on the ground, which brought to the world of ground maneuver massive capabilities and a longer range than had ever been seen before, and similarly with naval maneuver. But even more so, the second revolution brought industrialized action to the air, in the form of thousands of airplanes that took off from the ground or from ships at sea, and then flew in operational formations to conduct missions across the depth and breadth of the combat zone.

The development of the information dimension gave commanders the capability to communicate with one another by telephone and wireless communications, and to communicate information and coordinate operations in real-time. This capability also significantly improved the communication of commanders – on the battlefield and in the rear staffs – with the political echelon, thereby enabling politicians to make decisions almost in real-time.

The wars that best serve as examples of the Second Industrial Revolution are those in between the American Civil War and the First and Second World Wars. Notwithstanding the quantum leap between them, they best exemplify the Second Industrial Revolution. The American Civil War brought rapid communications to the front itself and between the front and the leaders in the rear, by virtue of the telegraph. The two World Wars made broad use of the products of the second revolution: tanks began to appear as weapons of war during the First World War, and improved enormously as fast and powerful maneuver platforms during the Second World War; aircraft that had begun to pop up as light models during the first World War, turned into heavy bombers and platforms for aerial combat during the second; battleships, aircraft carriers and submarines powered by combustion engines, were developed prior to and during these wars. And above all – communication capabilities enabled deep maneuver and the almost immediate connection between politicians and military leaders, and the capability to conduct a continuous dialogue within a relevant timeframe.

During this period, a new form of energy also appeared – nuclear energy. This energy was used during the Second World War and remained a central motif during the Cold War between the superpowers, and to a certain extent till today. This energy constitutes the peak of human maximization of natural resources to create destructive capabilities, which are directed primarily at the ground dimension. Alongside this revolution, a war for the control of space developed, which began with the creation of national space programs in the United States and Soviet Union immediately after the Second World War, and whose peak came at the end of the second revolution, with the landing of Apollo 11 on the moon on 2nd July 1969.

**The Third Industrial Revolution**

Several decades later, during the second half of the 20th century, a new form of technology appeared, this time electronic, with the invention of the transistor and the processor. These factors enabled the rise of computerized telecommunications, and after a process of improvement and miniaturization led to automation capabilities at an especially high level thanks to 2 key inventions: the programmable logic controller (PLC), which are the computerized power cores of the current era; and robots of different types, which are an assembly of computerized implementation capabilities. Robots exist on a spectrum between those intended to work alongside humans and those that can work autonomously in a range of fields.

From a technological and practical perspective, this revolution mostly further improved the combat dimensions that were improved during the first and second revolutions. The third revolution enabled the miniaturization of the technologies that served tanks and other ground combat vehicles, aircraft, and ships, and significantly improved the combat capabilities of these three dimensions. Furthermore, thanks to greatly improved computerized communications, this revolution improved the capability of the forces to communicate amongst themselves in real-time, and to help one another during combat.

In the information dimension, this revolution introduced the world of war to widespread and rapid communications, that allowed for the transmission of data about the war at rapid speeds and in large quantities within the army and without. For the first time, battlefields became connected, and they were filmed and transmitted across the globe in real-time.

The war that best represents the third revolution is the Second Gulf War, in which we saw for the first time a reverse ratio between the masses of technology and the masses of people on the battlefield. That is, one of the implications of the third revolution was a dramatic increase in the number of technological communication devices used by the forces on the battlefield and in the headquarters in relation to the size of the actual combat forces. Consequently, three divisions of the U.S. Army were sufficient to defeat the Iraqi army, given that the ground forces could rely heavily on assistance from the aerial and naval dimensions, thanks to the technological improvements in the information dimension. An additional implication of the changes in the information dimension was the media coverage of the war. This war was one of the most heavily covered, and television crews broadcast the events on the battlefield in the Iraqi desert directly into the houses of millions of viewers across the globe.

**The Fourth Industrial Revolution**

Today, we are at the peak of the fourth Industrial Revolution, the digital revolution, which began in the middle of the previous century, and which built on the third revolution. This revolution is characterized by a merging of technologies that blurs the distinction between the physical, digital, and biological fields across the globe. The breadth and depth of these changes is an indication of the industrialization of the information dimension, and points to a transformation of all fields of human endeavor, both personal and public.

This digitization enabled two key factors, which constitute a genuine revolution. The first is the capability to build new virtual worlds which influence the physical world and are also influenced by it. This capability relies on programming languages that enable the building of digital realities that do not have to follow the laws of physics in the human three-dimensional world. Physical production lines have been replaced by technologies such as coding, the cloud, big data, artificial intelligence and machine learning amongst others. The second factor is the reduction of time-space in the physical world to almost ‘zero’. Geography, as well as the response time required to transmit and feed virtual machines, is almost irrelevant today in terms of time. גיאוגרפיה, כמו גם לזמן התגובה ולהעברת המכונות הווירטואליות ולהזנתן, אין כמעט משמעות לזמן. This phenomenon has reduced space-time to create a phenomenon of ‘a small world’, or ‘a compressed world’.

In any case, the biggest influence of the fourth revolution was to compress time and space in the world of war, in comparison to the way they were shaped over thousands of years of warfare and during the three initial Industrial Revolutions.

To better understand the significance of the fourth revolution, we will return to a description of the combat dimensions – ground, aerial, space, naval and information. The third revolution, as noted above, did not create any new dimensions, but rather enhanced the activities in the existing dimensions that were shaped during the two previous revolutions, and improved the interconnections between them. This improvement was primarily enabled by the digitization and automation of different types of war machines, and the rapid and efficient communications between.

The fourth revolution has brought something else to the battlefield. This revolution has created an additional sub-dimension in the information dimension, the cyber dimension. Within this sub-dimension joint industrialized action that can influence the physical world is enabled. The uniqueness of the industrialization of the cyber dimension derives not only from the platforms within it, which include malware[[2]](#footnote-2) of different types and advanced information gathering tools that work within the dimension itself. The uniqueness derives from the ability of action within this dimension to affect other combat dimensions in the physical world, and in so doing to become an active partner to classical warfare. Malware that penetrates into the computerized systems (products of the third revolution) of a vehicle (products of the second revolution) and damages it; cyber offensive actions that disrupt the orderly functioning of our traffic, or the capability of precision munitions to hit their targets; intelligence gathering platforms that are able to damage enemy intelligence gathering platforms; computers that spread fake or real news about the war, and transmit them in a focused manner through social media in a deceptive manner, etc. – all of these are examples where activity in the cyber dimension can cause real damage in the physical reality on the battlefield and within public opinion anywhere on the globe.

Add in figure

The First Industrial Revolution The Second Industrial Revolution The Third Industrial Revolution The Fourth Industrial Revolution

Digitization of data

Industrialization of the ground and naval dimensions Industrialization of the aerial and space dimensions Industrialization of the cyber dimension

Here too, the industrialization of the cyber dimension is growing. This enables the massive employment of cyber activities, which achieve the desired result precisely due to the large number of actions taken. This works in a similar fashion to the industrialization of physical warfare through the massive use of standardized and similar weaponry. Furthermore, due to the unique nature of working with computers, the industrialization of the cyber dimension also enables computers to communicate independently among themselves, and even to employ cyber activities against targets defined by their operators. Additionally, this industrialization also enables an increase in the speed of the operations and their quality.

The results of this revolution are the compression of classic time and space on the battlefield. While the third revolution enabled faster and more accurate action, the fourth revolution indeed enables action on both the battlefield and the rear at the same time, at all the levels of war, with a relatively greater capability to accurately predict the results of any action. The fourth revolution compressed time, space and the levels of war towards ‘zero time’ and brought all those dealing with warfare to a chaotic and unstable situation.

While for commanders on the battlefield the previous three revolutions were genuine revolutions, for the political leaders, these revolutions only brought changes to the tools available to their armies. For armies, the relationship between the dimensions of time and space were clear and structured, and the difference between the revolutions only related to the question of how much time it would take to cross a space and conduct military action there. In the previous periods, until the third revolution, for tactical commanders the physical world of war was rapid and chaotic, but for the strategic commander and politicians, the world was more stable. This is reflected in the number of decisions that the leaders were required to take: military commanders had to make many and rapid decisions, while politicians had to make few decisions, and most of the time they lived in a more stable and organized world.

The cyber dimension changed all this. Given that the relationship between time and space had shortened towards zero, politicians discovered that politics became much faster, both internally and internationally. A strategic leader found that they needed to prepare many strategies for different situations, and to prepare themselves for numerous changes during a war. Consequently, politicians are required, more than in the past, to deal with the media and with the information flowing from the battlefield and back again, and to connect between political actions and the physical action taken place on the battlefield. Furthermore, both the strategic governmental level and regular citizens are likely to find themselves victims of cyber-attacks that manipulate the data that they require. The allegations relating to Russian attempts to influence the results of the 2016 American elections enable us to imagine situations where cyber-attacks might generate biased information, and lead to circumstances in which all the actors – soldiers, commanders, political leaders and civilians – are constantly in a chaotic psychological state.

To close our discussion of the fourth revolution, we should be point out that even though the cyber world is usually referred to as a virtual world, the facts reveal a picture that is not virtual at all. While it is true that the virtual world enabled the retention of information that in the past would only have been saved within large libraries on small memory devices, even in the virtual world there are physical elements of enormous size, starting with the physical infrastructure that enables the processing and transmittal of information and including the hundreds of thousands of people that write the code that builds the virtual world. The following map illustrates the undersea cables that serve the world and highlights one of the most significant physical elements of the virtual world.

Map is missing

The table below describes the primary developments and the secondary revolutions that have been analyzed in this section:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | The First Revolution | The Second Revolution | The Third Revolution | The Fourth Revolution |
| The Technological- Industrial Element | The steam engine | The internal combustion engine | The transistor and processor | Internet of Things (IOT), computerized communications |
| The War Element | Industrialized warfare in the ground and naval dimensions | Industrialized warfare in the aerial dimension | Strengthening the inter-connectability between the fighting forces | Industrialized cyber activities |
| Examples | Napoleonic Wars | The American Civil War up to the World Wars | The Second Gulf War | The wars of our time |

The significance of these changes will be analyzed in depth at the end of this chapter, after we have concluded several additional historical surveys, but we will highlight two key implications here. These arise from the survey of the technological revolutions: the first is that the industrialization of all the combat dimensions brings warfare to a new state. In this state, chaos, which was mainly the burden of the tactical forces, will increasingly rise to leaders at the strategic level, given that they, and the civilian world with them, are likely to experience cyber warfare of different types that will cause them to directly experience the phenomena of war. They will sense these phenomena via inaccurate reports that they will receive, via influences on the decisions that they need to take, etc. An additional implication is the need to build new tools, military and diplomatic, to deal with the changes described in this survey, and these new tools will need to be adapted to constantly changing needs.

**Three Distinct Periods in the Military Relations between Jews and Arabs in the Land of Israel During Modern Times – a Second Historical Survey**

A historical analysis of the last century in the Middle East reveals three distinct periods in the relations between Jews and Arabs in the land of Israel. These three periods were reflected in the political and military organization of the area and echoed the international organization in the context of the Middle East, and the influence of the superpowers of the time on the region.

The three periods are: the first period – from the beginning of Zionism until the middle of the 1948 War of Independence; second period – from the middle of the War of Independence until the 1990s; and the third period – from the 1990s till today.

The periods to be surveyed in this section overlap, mostly, with the period from the second industrial revolution onwards. This survey will emphasize factors that are not technological-industrial, rather it will focus on an analysis of three elements: national political organization, which was influenced by the global structure and its influence on the Middle East; the internal political organization of each of the conflicting sides; and the military nature of the conflicts.

Transitions between different time periods do not typically occur overnight, and there are opaque intervals of transition between them. Consequently, even though the conflict between the newly established IDF and the regular Arab armies began with the invasion in May 1948, before and after this date there was a transition period that allowed the change to mature, and to transition from the first to the second period. Similarly, the transition from the second to the third periods was also accompanied by a transition period, and there is disagreement as to when exactly the transition took place.

Yigal Alon[[3]](#footnote-3) and Itamar Rabinovich[[4]](#footnote-4) identify the period after the Six Day War as a transition period; Rupert Smith[[5]](#footnote-5) identifies the decade after the Six Day War, with the Yom Kippur War as the last war in the style of the second period; and it is also worth noting the Second Lebanon War, in which the IDF last engaged in ground maneuver against an Arab army,[[6]](#footnote-6) or the First Gulf War, as the last war which sealed the second period.[[7]](#footnote-7) In any case, the important issue is not the exact date of the transition, but rather identifying the changing phenomena, and in so doing to distinguish between periods, and understand the implications of the changes.

The historical division is expressed in the figure below:

Historical Structure – the phenomenon and their reflection in weapons systems

|  |  |  |  |
| --- | --- | --- | --- |
| Organizations vs Organizations | Regular state armies vs Regular state armies | Armies and organizations vs Armies and organizations | The Phenomenon |
| The Ottoman Regime | The era of the nation state | The breakup of States in the region | As a Reaction to |
| Light weapons | Combat Platforms and Formations | The rise of standoff fire and precision fire | Primary Weapons Systems |

Conflict Between Jews and Arabs Independence War Sinai War Six Day Attrition Yom Kippur 1st Lebanon 1St Gulf 2nd Lebanon Cast Lead Pillar of Defense Protective Edge

From the Beginning of Zionism to the War of Independence

**Historical Structure**

**The first period**, from the beginning of Zionism until the War of Independence, was characterized by warfare between small paramilitary organizations from both sides of the devide. On the Jewish side, these were local organizations, initially HaShomer (the Watchman) and Bar-Giora (in the first two decades of the 20th century) which developed into national organizations in the form of the Haganah (from the 1930s onwards) and the other underground organizations. On the other side, they faced local organizations of Arabs.[[8]](#footnote-8) This period was influenced by the heritage of the Ottoman regime, and while Ottoman rule came to an end in the middle of this period, its influence remained. Its influence was reflected in the lack of nation-states and national armies, immigration towards the greater Land of Israel and within it, and local organization based on differing loyalties. Although the Jewish side continued to organize itself around one national focus point, this process took time to develop, and was accompanied by long labor pains.[[9]](#footnote-9)

**The second period**, from the War of Independence and until the 1990s, was characterized by clashes between organized armies. In the figure above, we refer to war during this period as “war using combat platforms and formations”, which reflects the organized orders of battle and heavy weapons used. These clashes took place between organized and regular maneuver forces, which were reflected in the structure of the military units. This period was influenced by the Mandatory government which ruled the area; the British Mandate led to organization around nation-states, which in many cases were artificial, but they led to the creation of regular national armies. These armies fought each other on the battlefield in the border areas, with heavy maneuver weapons. The military clashes of this period were managed on the basis of the second Industrial Revolution, and many of their characteristics were similar to the World Wars.

**The Third Period**, from the 1990s till today, is characterized by an amalgamation of characteristics, and it takes place between armies and organizations. This amalgamation is reflected on the one hand by a renewed threat from paramilitary or irregular organizations (for example, Fatah-Tanzim, Hezbollah in the past, Hamas), and on the other hand a phenomenon where other organizations are becoming more organized and hierarchical, and adopting military patterns of behaviour (for example, ISIS at its peak or Hezbollah today). This period is referred to in the figure as “Wars by armies and organizations vs Armies and organizations” which reflects the differing organizational forms of the various actors – from regular armies to organizations, some of which appear to be similar to armies, and through to organizational structures that present a particular irregular threat. The warfare in this period is characterized by the rise of standoff fire and precision fire, that is an increased use of fire at longer ranges, either area fire or accurate fire. All off the sides have increased the use of these weapons, with each side using their own specific capabilities. The fire threat can be executed through area fire or accurate fire, the precision weapon threat can hit with great accuracy and at very long distances (thousands of kilometers), through the use of suicide bombers focused on a particular location, through cyber-attacks or information operations focused on a particular action, or even the use of special forces to achieve a very specific mission. These forms of organization are the result of the regional upheaval and the breakup of some of the nation states that arose during the second period, the breakdown of the Cold War global order and the strengthening of local, religious and ethnic influences, both internal and external to the Middle East. The characteristics of the conflicts that the State of Israel has experienced are becoming closer to the characteristics of the wars of the fourth industrial revolution, in that the information dimensions of the conflict, especially the cyber dimension, are becoming dominant and are reflected in various forms.

The following table briefly describes the general trends that were described above during each of the three periods:

|  |  |  |  |
| --- | --- | --- | --- |
|  | First Period | Second Period | Third Period |
| National political organization | Without nation-state organizations | Nation states, some of which were kingdoms | Various forms of political organization: from governed nation states to failed states and areas without any governance |
| Internal political organization | Local, ethnic and tribal loyalties; the beginning of Jewish self-organization | Relatively high levels of governance in most states | Strengthening of local, ethnic and tribal loyalties, alongside governed states. |
| The military character of conflicts | Organization vs organizations; The Jews showed initial signs of self-organization | Primarily between armies, similar to the wars of the second industrial revolution | Armies vs armies (grey zone operations) and armies vs organizations and functional groupings with one focus |

After our brief survey of the three periods, we will now turn to deepening our understanding of each period. We will begin with the second period, because of its distinctiveness and unique nature.

**The Second Period**

We chose to open this discussion with the second period precisely because it was significantly different from the periods that preceded and followed it.

In terms of general state organization, this was a period in which the Middle East was shaped by the global superpowers, and emerged into a group of nation states, some of them monarchies, which built regular armed forces, as a part of their essence as nation states. The State of Israel is no exception. In this period, it organized as a state entity and built an army to face the threats that it had identified.

In terms of internal political organization, this period was categorized by regimes with high levels of governance, relatively, over their territory, despite the large social differences within them in terms of ethnicity and culture. These regimes were relatively successful in harnessing their national resources to support their governing systems and to lead to their armies through several regular wars and military conflicts with the State of Israel. Although during this period the Arab states used terror and guerilla forces against the IDF and Israeli citizens (the fedayeen from Egypt and Jordan, terror from Syria, the battles over water during the 1960s), these actions were sponsored by the Arab armies and the IDF mainly acted against them as the army of the State of Israel.

In terms of the military character of the conflicts, this period was exemplified by warfare between regular armies, which can be characterized as wars of the second revolution. The second half of the War of Independence, from the invasion of the Arab armies into Israel in May 1948, was characterized by warfare between the developing and growing IDF and the armies of Egypt, Jordan ([original not clear – there is a note from the Hebrew editor]), Syria, Lebanon, Iraq and other expeditionary forces from other Arab states; the Sinai War (1956) was a war between the armies of Israel, Britain and France against the Egyptian Army; and the Six-Day War (1967) and the Yom Kippur War (1973) took place between the IDF and the armies of the Arab states. Consequently, we can say that most of the military action that related to the conflict during this period manifested as wars between armies, which were formed into regular army units, and which were used as organized and heavy combat platforms. This regular force employment began to change in the period between the Yom Kippur War and the First Lebanon War (1982). During this period, armies changed slowly, primarily in their mix of weapons systems – an increased use of fire systems and a decreased use of regular maneuver formations, as well as the renewed rise of organizations – such as Hezbollah and Hamas. It should be emphasized that this period does not end with the breakup of the Arab armies, but in their slow transition to new directions.

That said, the second period was characterized by political organization into nation states, which harnessed their resources to establish regular national armies and to employ them.

**The First and the Third Periods**

Compared to the second period, the first and third periods were characterized by different political characteristics, different internal political organization and different force employment.

During these periods, the national political organization reflected a lack of national structures (in the first period) or the diminished functioning of sovereign states (in the third period). During the first period, the Middle East was under the rule of the Ottoman Empire or the European mandates, British or French. Most of the states in the region had not yet arisen as states in the modern sense. In contrast, during the third period we have witnessed a process of the breakup of some of the states around us. Some states have been divided into areas under different types of rule, as well as into lawless regions that are controlled in different ways and forms. This characterization has also changed the internal political organization of the states, such that their internal organization is neither strong nor stable, as they were during the second period.

The military characteristics of the conflicts is a third area in which we can see a contrast between the different periods. This has involved a change from warfare between regular armies fighting one another, to warfare against focused functional arrays, which use a logic that is quite different to classical military logic. These organizations have attempted to structure themselves to deal with the tactical or strategic problem on which they are focused. Given that they lack a strong military tradition, they can concentrate their capabilities on achieving results, whether strategic or tactical, as well as creating challenges in areas that are not traditionally the responsibility of an army.

In this context, it is worth emphasizing that these organizations have an advantage over armies, given that they are not subject to the laws of war and international conventions, and they therefore allow themselves to attack civilian targets. The armies of Western-Democratic states work within the framework of the law, as far as possible, and are therefore limited in their capability to act against the enemy’s assets.

The differences in the military characteristics of the conflict during each period will be analyzed below based on five key criteria: the organizational structure of the enemy; combat doctrine; the number of combat platforms in relation to soldiers; enemy weapons systems and the problems they create; and the underground realm.

**The first criteria – organizational structures**: During wars fought against a regular army, one faces organizational structures based on headquarters (HQs) and command and control systems organized in a standardized military manner. That is, the armies followed a clear chain of command, which begins with the lowest ranked soldier and his commander and rises through the command hierarchy to the senior commanders and the political echelon. Furthermore, the order of battle is based on maneuver forces using heavy and sophisticated weapons on the ground, in the air and at sea, as well as disciplined manpower that had undergone consistent and orderly training.

However, war against irregular forces blurs these structures. Command and control (C2) in a decentralized organization is different from military C2, it is loose and fuzzy in comparison. That is, while armies ensure military discipline and an organized hierarchy, in these organizations discipline is more relaxed, and there is greater freedom of action. Enemy combatants are not equipped with heavy and sophisticated weapons, are not deployed in clear geographic military units, training is inconsistent, and in most cases is only at a basic level, discipline is loose, they are not distinguishable through military identification such as uniforms and ranks, and even if so – they can rapidly dispose of them and assimilate into the civilian population.

One implication of this criteria, in relation to enemy combatants, is the military manner of identifying the enemy. In the past, due to the use of heavy weapons and organized formations, the primary tools for identifying the enemy were binoculars and telescopes of different types. Using binoculars, it was possible to identify the enemy and their preparations, and based on the picture that arose, it was even possible to make an estimate of their future intentions. However, today binoculars have a different significance on the battlefield, almost technical in nature, given that enemy forces are usually hidden, combatants mostly do not wear distinctive military markers, and they are not organized into regular military formations. Consequently, today we require different and more advanced means to identify and detect the enemy, and even digital systems to create a picture of enemy preparations.

**The second criteria – combat doctrine:** Regular armies operate using standardized military doctrines and military logics, Western or Eastern, whereas irregular forces operate using other types of logic. This contrast has a major impact on force employment. Warfare against armies enables our forces to develop operational concepts – such as, for example, achieving a tactical military victory by damaging the enemy’s C2 or its reserve formations – and on this basis to develop combat techniques and appropriate weapons systems. When an army understands the operating methods and behavioral patterns of an enemy army, it can prepare itself to act to neutralize the enemy’s power. For example, for armies that use standard C2, damage to its C2, (ie. its commanders and HQs) will generally cause fatal damage to that army. Similarly, damage to its military reserve can cause significant damage to the army, given that this would disrupt its operating plans.

However, in warfare against decentralized organizations that use a different type of logic, striking their C2 and their senior leaders does not at all guarantee the neutralization of their fighting forces, given that these organizations can continue to fight even without receiving regular orders, and even without an active chain of command. Also, with regard to weapons systems (if they are distinctive) these organizations create a challenge for armies. Generally, they use weapons that are cheap and easy to replace if destroyed, as opposed to tanks and artillery, which are expensive, complex to repair and difficult to replace if damaged. The same is true for reserve formations - given that it is not always clear who the reserve formations are, it is not clear what the benefits of striking them will be, even if they are identified. Furthermore, given that irregular forces are not deployed in set geographical arrays, it is not clear how effective the capture of territory is for the purpose of a military defeat of the enemy. This situation requires our forces to develop new concepts to deal with a decentralized enemy.

In summary, in relation to these organizations, the classical military terms of decisive defeat and deterrence become blurred, and they create a challenge for force employment by the IDF and other western armies.[[10]](#footnote-10)

**The third criteria – the ratio of platforms to soldiers:** Given that regular armies were dependent on heavy and sophisticated weapons with large signatures – tanks, battleships or aircraft – the number of platforms was small in relation to the number of soldiers. Armies had good capabilities for identifying these platforms, but their ability to replace them during war, if they were destroyed, was low. Furthermore, sophisticated weapons systems require substantial logistical capabilities. These burden the military order of battle with many additional soldiers that do not take an active part in the hostilities but support them in different ways – as a result, not all soldiers participate directly in combat.

However, with irregular forces, each member is equipped with cheap, simple and mobile weapons, and in many cases both the combatant and the weapon are replaceable. Consequently, an irregular force has a much larger maximum potential than a regular force of an equivalent size, given that every combatant is a potential frontline soldier. Nevertheless, we are only using the term potential power, given that the weak C2 and discipline frameworks limit the capability of these organizations to utilize their force to the fullest. Furthermore, the technological capabilities of regular armies clearly grant them greater power and capabilities to practically fulfill their potential.

Irregular forces generally have a lower signature than an equivalent regular force. Consequently, to achieve military results by exhausting an irregular force, one needs to kill large numbers of its members, even if they can be replaced relatively quickly. No option exists to destroy a relatively small number of platforms, each with a large signature.

Moreover, the fourth revolution, which brought with it cyber warfare, enables civilians anywhere on the planet to actively participate in the warfare, through different types of cyber-attacks. This option raises the specific value of every person and turns them into a potential combatant who could cause great damage.

**The fourth criteria – enemy weapons systems and the problems they create:** the third period brought with it changes to enemy weapons systems and this caused numerous problems. During the second period, heavy and sophisticated platforms were the primary technological power behind a military force, and consequently they were the primary challenge to the IDF. The range of these platforms was relatively short and was limited to the geographical area of the battlefield, which was usually far from the populated regions of both sides. These platforms were directed primarily towards the military forces of the enemy and not towards civilians. Even when there were other challenges, with an ability to project influence over longer ranges, such as longer-range missiles, these represented a marginal threat in relation to the primary threat from the maneuver platforms.

For example, the primary threat to the IDF Southern Command during the Yom Kippur War was the maneuver divisions of the Egyptian Army. This threat was limited to the Southern Command’s battle zone and the range of the Egyptian artillery, and possibly their aircraft. The missile threat to Israel was limited (a small number of SCUD missiles), and it was not directed at the home front. The threat to the Israeli home front, as during the Six Day War, stemmed from the threat of physical capture of Israeli territory by the enemy formations, or attacks by its long-range aircraft bombers. In contrast, today the challenge of geographical maneuver for IDF forces has been reduced, but other threats, such as missile and rocket fire, cyber-attacks not limited by physical borders, increasingly accurate UAVs, the threat of a limited incursions to capture territory, penetration into civilian communities, etc., have all increased.

Furthermore , the range of these threats has increased significantly, such that tactical threats from the South (the Gaza Strip and Sinai) and the North (Hezbollah and Syria) threaten all of the territory of the State of Israel, and have become a strategic problem. Consequently, in terms of the problem created by enemy weapons, there has been a transition from threats whose essence was geographic and local, to threats that breach borders in the physical realm, reach much longer ranges, or are not even a limited to physical space, such as cyber and information operations.

The figure below demonstrates the difference between the two periods in terms of weapons. In the second period, the military problems were limited to a clear geographical space (the army of a particular country threatened to invade or threatened border communities) and thematic threats were limited (small numbers of SSM units for example). On the other hand, even though the problems today are primarily within the geographic realm (a terror organization that works within a particular area), the entire length of the State of Israel is under threat (for example from fire that can reach all parts of Israel) and even further (cyber-attacks, damage from influence operations). The figure conveys the different weights associated to the thematic threats as opposed to geographic threats:

|  |  |
| --- | --- |
| Past | Present |
| * Limited specialized weapons systems * Limited NTA[[11]](#footnote-11) of civilians * **Marginal Media Communications** * Short range missile and rocket fire in small quantities * **Limited unconventional weaponry**   Geographical Thematic  Geographical operations arena | Geographical operations arena  Geographical Thematic   * Extensive specialized weapons systems * Extensive NTA of people * **Focused Media Communications** * Short range missile and rocket fire as the primary problem * **Extensive unconventional weaponry** * **Cyber** |
| The thematic problems are marginal, and their role is limited to the geographic area | The thematic problems have influence outside the classical geographic divisions |

**The rise of thematic threats in relation to geographic threats**

The rise of thematic threats as compared to geographic threats is highly significant because today enemy operational threats breach the boundaries of warfare that were accepted in the past, within both physical space and within the levels of war (the tactical level, the strategic level or the broader-strategic level, which is the political-diplomatic level). We are referring to thematic threats derived from tactical means that threaten the entire area of the State of Israel and therefore easily challenge the broader-strategic level. The first sign of this could be found in the missile fire towards Tel Aviv during the First Gulf War. During that war, a relatively small number of SSM were fired towards central Israel and created a challenge for the Israeli home front, caused population movements (mainly away from the center) and closed down several sectors of the Israeli economy.[[12]](#footnote-12) Another example of this is that during recent Israeli campaigns, fire towards the home front (and the lack of a response capable of completely solving the problem), despite the relatively low level of damage caused, has intensified internal tensions relating to the Israeli government and its leader. In other aspects, IDF action, primarily in the cities and built-up areas of the Gaza Strip, created unexpected strategic repercussions that challenged Israel and damaged its legitimacy to employ force.

Consequently, these thematic threats have become their own operational arena, which is not limited to one geographical area. Therefore, one should see these thematic threats as an independent arena.[[13]](#footnote-13)

**The fifth criteria – the underground realm**: Another military-tactical aspect which is developing in the field and has a strategic influence is the renewed use of the underground realm as a combat space. Underground warfare is not new to the world or to our area and was certainly not invented by Hamas or Hezbollah. However, its renewed tactical use and the way it is being used by our enemies has been influential in strategic terms. One area of influence has been to create challenges for our aerial offensive and intelligence platforms, which forces us to undertake ground action to deal with the underground realm, for example, by employing ground forces in combat, with all the risks entailed. Given that the underground warfare space is sometimes located under cities and built-up areas, an additional strategic challenge is created, related to military action in a dense urban environment. The following table summarizes the differences between the second and third periods, in relation to the aspects described above:

|  |  |  |  |
| --- | --- | --- | --- |
|  | | The Second Period | The Third Period |
| National Political Organization | | Nation states and their armies | The breakup of some states, increased ethnic, tribal, and religious loyalties |
| Internal political organization | | Strong central regimes (relatively) | Failed states, the development of frontier areas with low governability, alongside the continued existence of strong sovereign states |
|  | General | Regular armies | Armies and organizations, both regular and irregular |
| Organizational structures | Regular HQs and Military C2;  Heavy maneuver focused order of battle | Traditional armies alongside organizations whose C2 is loose and unclear;  Light order of battle, armed with cheap weapons |
| Combat doctrine | Clear military doctrines and military logic | A mix of logics |
| Ratio of platforms to personnel | A low number of platforms in relation to personnel | A similar number of personnel to the number of combat soldiers and the number of problems. |
| Enemy weapons and the problems they create | Primary weapons are short range and designed to hit armies;  The problems are organized geographically | Long range weapons, of different types (missiles, rockets, cyber, UAV, capture of limited territory and penetration into civilian communities);  Tactical means become strategic problems |
| The underground realm | Limited use | Increased use of the underground realm, especially in urban areas |

This historical survey of the characteristics of the political-diplomatic and military conflict between the State of Israel and its enemies reveals the significant differences between these three distinct periods. The military significance of these differences relates to the transition from a military threat based on regular armies fighting one another, to thematic threats of a varied nature, which are difficult for regular armies to cope with.

When we connect the above conclusions to the industrial revolutions, the connection between them becomes much clearer – the second Industrial Revolution and the beginning of the third shaped the traditional armies in the Middle East in general and the IDF in particular, and the way that they fought each other in the second half of the 20th century. However, the fourth Industrial Revolution, together with the political diplomatic changes which have occurred in our region, created organizational models that can take advantage of new technologies, and in so doing challenge existing armies. Understanding these changes helps us to comprehend the need to change our force employment theory, and the tools to implement it.

We will now turn to another historical viewpoint, from the perspective of the Industrial Revolutions, that enable us a different point of view of the phenomenon, with a focus on the weapons used in combat.

**Precision Weapons Globally and in the IDF – a Historical Viewpoint**

Over thousands of years of war, humanity knew only one way to solve a military problem in a specific geographical area – to bring ground forces to that area. The level of impact of a ground force was derived from the range of its armaments. In ancient times, the range of armaments was so short that any problem could only be solved by the physical presence of a ground force in the area where the problem arose, and only through direct physical contact between the combatants of both sides. In other words: the only solution was the capture of territory and the destruction, submission or expulsion of the enemy to be found there.[[14]](#footnote-14) This reality did not change, even when firearms were invented which increased the range of armaments to hundreds of kilometers or even thousands of kilometers with the use of aircraft.

This situation only began to change when precision weapons entered military arsenals. These weapons are based on two factors: precision technology and improved intelligence. Precision technologies enable highly precise strikes, to within a few meters or less of an intended location. Improved intelligence includes traditional and new methods of intelligence gathering, impressive new capabilities to analyze the information that is gathered, and consequently, intelligence personnel are now able to provide extensive and accurate information in real-time. These two factors in combination are termed “the fusion of fire and intelligence”. This fusion was natural given that both these fields are technology intensive which enables, almost naturally, the automatization of the processes within and between them.

Precision weapons are a product of the third Industrial Revolution, which made possible the miniaturization of the technological components for observation, navigation, piloting and homing, to connect them to different armaments, and to direct to them – generally autonomously and from great distances – precisely towards a target. Precision weapons began to be developed from the end of the Second World War but reached a critical mass that enabled their massive use only at the end of the 20th century. When the IDF began to integrate precision weapons in the 1970s, during the period in which the IDF fought other armies (as described in the previous survey), they were intended for warfare against combat platforms, in particular armored platforms. The transition to the third period (fighting organizations) brought a change in the designated purpose of these precision weapons and to their adaption to the operational needs of warfare against organizations. The following survey describes the development of precision weapons, and the way they have been integrated into the IDF.

Today the family of precision weapons includes an exceptionally large number of accurate platforms, both military and non-military, that are organized into a well-oiled and focused system. The most famous weapon is the American Tomahawk missile (BGM-109), one of its versions has a range of up to 2500 km; it can carry a warhead of 1,200 kg; and its accuracy is similar to that of a GPS navigation system.[[15]](#footnote-15)

This family of weapons is not just made up of smart bombs. The concept of achieving a focused impact, regardless of the form it takes, has expanded over the years and has become a family of highly varied tools. The most prominent of these are: special forces; missile defense systems to protect critical assets, infrastructure and even people; personalized diplomacy; and cyber warriors who can deploy computer malware of different and varied types.

The precision weapon family enables a military force to reach an operational problem from any direction, at varying intensities, at accelerated speed and to achieve results that appear no less successful than could be achieved through massive ground forces. In this era of new wars, it seems possible to use military platforms whose combat worth is much higher than that of the past. These platforms can enable strategic objectives to be achieved, given that an accurate and well-timed strike can destroy a vital enemy system that might have taken years to build.[[16]](#footnote-16) It seemed that greater strategic flexibility in force employment had also been created, as was demanded during the discourse between the military and political echelons.

At this point, we want to emphasize that precision weapons are not the sole preserve of armies. Weak states, semi-national organizations and terror organizations that lack large budgets still use this family of weapons for their needs. The attack on the Twin Towers on 11 September 2011 was conducted by precision weapons in the form of passenger aircraft. These aircraft, with their large mass and the fuel they carried, constituted the explosive material for the precise destruction of the buildings. A terrorist carrying an explosive vest who marches into a defined target, an explosive vehicle driven by a driver towards a specific building, or a fishing boat loaded with explosives sailing near one or another strategic asset at sea, also belong to the family of precision weapons. All of these means are a part of the precision weapon family, given that they enable the employment of focused military force in a strategic context.

It was politicians, who chafe against a world of constraints, and not military men, who first identified the inherent ability of precision weapons to achieve strategic accomplishments. The precision weapons family enabled them to do things that were less achievable with older tools. These include: the direct control of a military force at all the levels; highly accurate forecasting of the chances of success of any action, or at least a reasonable forecast of injury to our forces, and the level of collateral damage at all levels; the ability to achieve focused effectiveness using limited operations and limited numbers of personnel; a high level of readiness of the tools, from the moment a decision is taken to use them until their impact is felt and to reduce the hostilities that were a central phenomenon when employing force using the old tools.

A clear example of the connection between the precision weapon family and decision-makers can be seen in the famous photograph in which Barack Obama, at the time President of the United States, sat with senior American officials and watched an operation taking place thousands of kilometers away. Operation Neptune Spear, which took place on 2 May 2011, was executed by special forces who were sent to kill Osama bin Laden, the leader of the Al Qaeda organization, who was responsible for blowing up the Twin Towers on 11 September 2001.

Several decades passed between the first development of precision weapons until they reached a critical mass that could be clearly felt on the battlefield and enabled heads of state and army chiefs to employ them at sufficient levels to be a genuine replacement for ground maneuver. The following figure outlines their development in the IDF:

|  |  |  |
| --- | --- | --- |
| Anti-Tank Guided Missiles (ATGM) | Tammuz 1/2 (1990) Tammuz 4-Spike NLOS (2000) Additional Means 2010 | |
|  | Orev (TOW) (1973) Gil (Spike-MR) (2000) | |
| Aerial Precision Guided Munitions (PGM) | Zarit- (MAU-157 Pave way) (1970) Aerial PGM (1980) Aerial PGM (year?) Aerial PGM (2000) | |
| Naval Defense | Precision naval defense systems | |
| Active Aerial Defense | Star Wars SDI (1989) | Iron Dome |
|  | Arrow Project David’s Sling-Magic Wand |

Peace with Egypt Peace with Jordan

Independence War Sinai War Six Day Attrition Yom Kippur 1st Lebanon 1St Gulf Terror Attacks 2nd Lebanon Cast Lead Pillar of Defense Protective Edge

48 56 67 69 73 77 82 90 2000 06 09 12 14

**The Precision Weapons Revolution from a Historical Perspective – from the founding of the state till today**

The above figure shows the development of precision weapons over time. Across the time axis, from left to right, the key violent events that have accompanied the State of Israel are noted – from the War of Independence in 1948 until Operation Protective Edge in 2014. Within the body of the figure, the primary initiatives in the field of precision weapons are presented, and it becomes clear that precision weapons have become a vital and central component of force employment in the IDF.

The development of anti-tank guided missiles (ATGM) are presented above, from the Tammuz family which was developed at the beginning of the 1990s, up to more advanced means in the same family, which entered service in the IDF in 2010. The entry into service of the TOW is also presented, as is its replacement by the Gil (Spike-MR), from the 1970s to the beginning of the 21st century. The difference between these types of missiles is in the launch platform and technological capabilities, but they share an ability to strike armored combat vehicles, houses or people, with precision and accurately, from a long-range. The following group are known as Aerial Precision Guided Munitions (PGM),[[17]](#footnote-17) these are powerful precision armaments (with hundreds of kilograms of explosives) that can be fired from an aircraft and whose ability to hit a target has become increasingly accurate, within a radius of just a few meters.

The next group is used for naval defense,[[18]](#footnote-18) as a part of the active defense group. This defense includes initiatives to defend ships from coastal or anti-ship missiles (due to the classified nature of these missiles, we are unable to publish their names).

The development of precision weapons over the years can be analyzed on the basis of the two historical surveys above. From the creation of Israel up to the War of Attrition and the Yom Kippur War, which were based on the Second Industrial Revolution and on the period where the IDF primarily fought enemy armies, the IDF focused its force generation on maneuver forces, and had a clear offensive ethos. The IDF fought and focused its force generation on the Arab armies. That is, armies that employed regular military formations and platforms, and maximized capabilities that were developed during the second Industrial Revolution and greatly improved after – maneuver platforms based on the internal combustion engine and wireless communications.

The War of Attrition, which prevented the IDF from maximizing its maneuver forces due to the extensive use of guerrilla warfare, and the Yom Kippur War, which challenged tanks on the ground (through anti-tank missiles) and aircraft in the air (through Surface to Air Missiles-SAMs) – generated question marks about the lofty status of armored maneuver and the existing aerial force employment. The First Lebanon War also raised questions about the effectiveness of maneuver forces achieving results in the developing field of wars against organizations that are not regular armies. Against this background, the First Gulf War was a revitalizing development for military thought. The war showed that it was possible to employ precision weapons as an effective tool in massive quantities, and to achieve impressive operational results. The technological developments that were integrated into the IDF at this time (ATGM and Aerial PGM) contributed to additional changes in the IDF.

During the 1980s and 1990s, during which no wars or campaigns of a similar size to the previous two periods took place, the IDF employed force using different methods for each conflict arena – South Lebanon, in Judea and Samaria and in Gaza. During this period the IDF procured large and improved quantities of anti-tank missiles and aerial PGM; began to develop active defense systems; and also began to develop security fences and protected spaces – all of them precision means. All of these developments are from the precision weapon family, but it took the IDF several more years for the IDF to employ these platforms in massive numbers during a war, in a manner that would challenge the status of maneuver as the central tool in warfare and for achieving military objectives during war.

From the 2000s to the present, the IDF has employed precision weapons as a complete system. During this period, the IDF maintained a critical mass of precision weapons that it continues to develop and expand in terms of quantity and quality, and with which the IDF manages a large part of its conflicts. The Second Lebanon War was the first war that was managed in this fashion, but it was only partly handled through the use of the precision weapon family, given that the IDF did not yet have appropriate and relevant active defense systems,[[19]](#footnote-19) and other components from the family were also missing, and some of which are still missing. In contrast to the Second Lebanon War, the campaigns in Gaza, especially Operations Pillar of Defense and Protective Edge were campaigns in which the IDF made almost complete use of tools from the precision weapons family – from offensive weapons, through to active defense and including information operations and focused diplomacy.[[20]](#footnote-20)

However, despite the great expectations, precision weapons did not substantially change the phenomenon of war, and a new revolution, which was expected by some, did not take place. The primary reason for this was the systemic pull towards precision weapons, which despite the impressive new capabilities they brought to the world of war, were not able to prove their ability to achieve a decisive defeat or to end conflicts. Handel calls this the “tyranny of weapons” and he brings a decisive quote from Mau Tse-tung:

“… This is the so-called theory that ‘weapons’ decide everything, which constitutes a mechanical approach to the question of war and a subjective and one-sided view. Our view as opposed to this; we see not only weapons but also people. Weapons are an important factor in war, but not the decisive factor; it is people, not things that are decisive. The contest of strength is not only a contest of military and economic power, but also a contest of human power and morale. Military and economic power is necessarily welded by people.”[[21]](#footnote-21)

Or in its modern form, as formulated by Yarger: “The precision strike argument, a modern version of strategic bombing, is a potential contemporary military example of strategic monism. It substitutes technology for manpower, reduces casualties, and seeks to force the adversary to concede with limited collateral damage. It is a powerful capability, and may be an essential one, but it is not a singular solution to military strategy. Technology does not change the essence of war, or even the cruel face of it in all circumstances. Technology is an enabler at the strategic level, not a substitute for a strategic concept.”[[22]](#footnote-22)

Consequently, while the precision weapon revolution brought an arsenal of armaments with impressive capabilities to the IDF, they did not change the phenomenon of war. This revolution was enabled by the Third and Fourth Industrial Revolutions and adapted itself to the current shape of the Middle East. However, despite its great contribution to the operational capabilities of the IDF, it did not solve the operational problems facing western armies including the IDF. This revolution did contribute to an imbalance between the attrition and maneuver approaches and led to a clear preference for employing counter-fire supported by defense, over maneuver.

**An Evaluation of Change in the Systemic-Strategic Status of the City**

After these three historical surveys, which described how war has changed over the last hundreds of years, we will now focus on an additional field in which the phenomenon has also changed – a change in the significance of cities to warfare.

Warfare within cities is not a new phenomenon in the history of war, and the ‘victory image’ of most wars includes a city – whether a destroyed city or a picture of the soldiers of the victorious army marching through or raising a flag in the city. However, during the industrialized wars, and especially the IDF’s wars, there was a preference to fight, or at least to open a war, outside of cities. The reason for this was the ability to create a “military playing field” between states, not in cities, together with a sensitivity to human life and urban infrastructure, or in other words – a desire to avoid damage to cities. The entry into cities, both by the defender and the attacker, was generally done when there was no choice – the defender would enter a city only when forced to do so, and the attacker would enter to attack the army that was already in the city. Furthermore, in many cases an attacker would prefer to besiege a city and starve it, rather than entering it.

This is clearly defined in IDF doctrine:

“Due to the difficulty of urban warfare, where possible it is preferable to avoid capturing cities with defenders. It is better to outflank them, besiege them and try to bring about their surrender by capturing the controlling areas around them and by demonstrative operations, such as noise from the air, propaganda, etc. However, fortified cities that block access of movement, or that are located at vital junctions, or whose fall is of practical importance or will be decisive to morale, need to be attacked.”[[23]](#footnote-23)

In the Israeli context, the IDF mainly fought outside the enemies’ centers of gravity and population centers, in general the capital cities and their environments. Sinai, Judea and Samaria and the Golan Heights were peripheral areas of the Arab states that fought Israel, and if they were settled – it was only sparsely. To reach the enemy centers of gravity, the IDF needed to pass through several defensive systems (in Syria) or through geographical spaces (large such as Sinai or smaller such as Judea and Samaria and the Jordan Valley). While moving forward, it engaged the enemy armies, usually until a diplomatic agreement was reached. A diplomatic agreement was usually reached due to the direct and genuine threat to an Arab capital city, for example, during the Yom Kippur War due to artillery fire on Damascus or the Israeli forces reaching 101 kilometers from Cairo.

Thus, for example, the IDF mission to stop Jordanian artillery fire on the Ramat David airfield at the beginning of the Six-Day War, required the capture of the Dotan Valley near Jenin, but the capture of the city of Jenin, even if it was part of the military mission, was not at the heart of the mission – the entry of IDF forces into Jenin was apparently done in order to increase the diplomatic pressure on Amman, and was not related to the military mission of removing Ramat David and the Dan region from the range of Jordanian fire.[[24]](#footnote-24)

Similarly, the decisive defeat of the Egyptian Army and the encirclement of its Third Army during the Yom Kippur War were not related to the capture of the city of Suez as a city (which was completely empty of inhabitants), but rather to complete the encirclement of the Third Army, which was outside the city.[[25]](#footnote-25) While the IDF did fight within cities during each of its wars, cities were generally not the focus of the IDF mission or warfare – these were conducted outside of cities.[[26]](#footnote-26)

Today, combat almost immediately takes place within city centers, given that the IDF sits right on their threshold, and they are not just governmental and population centers, but have also become military spaces. In this situation, the IDF must immediately deal with all the civilian infrastructure that serves a military force – any military force, whether regular or irregular – that are located within populated centers. Furthermore, today the military importance of cities has increased: the consolidation of enemy forces within cities has made warfare within them and their capture unavoidable. Consequently, the capture of cities and warfare within them has become the primary military mission. As a result, the IDF found itself fighting in cities in Lebanon from the 1970s, due to the entry of terrorists into the cities.

Similarly, the primary mission of the IDF was to destroy terror organizations during Operation Defensive Shield, which required combat in populated areas including the Jenin Refugee Camp in order to destroy the enemy within it, and broad military action within Nablus for similar reasons. During the recent conflicts in Lebanon and the Gaza Strip, there were also massive attacks on cities, and there was even ground combat within them. Furthermore, today one cannot imagine warfare against organizations that does not include offensive actions within cities, in all the combat dimensions.

The reason for the changing status of the city is related to the close connection between the processes that were identified in the surveys above. While in the past, enemies were organized into regular armies, whose forces and commanders acted without connection to their geographical location, today the irregular organizations are increasingly entering cities, and creating sanctuaries within them.[[27]](#footnote-27) There are several reasons for this phenomenon and it has several characteristics that should be noted, including the following.

**Concealment and shelter from military operations against organizations:** The entry of organizations into cities enables them to camouflage their activities and to defend themselves against intelligence collection and the offensive platforms in the Western armies’ precision weapons family - primarily aerial platforms. The houses and urban landscape in the city enable this, as well as underground infrastructure such as sewer systems. Furthermore, activity within cities, especially when camouflaged and with no external military indications, enables the organizations to conduct their activities with almost no disruptions from the army fighting them.

**Strengthening mutual influence with the civilian population**. The city enables organizations to strengthen their influence over the civilian population, as well as receiving its support or enforcing control using force.[[28]](#footnote-28) Its presence in a city enables the heads of an organization and its representatives to meet directly with the population and to influence them, and to strengthen their leadership and power over the population. Furthermore, during an uprising, the city enables organizations to receive funding and supplies from the residents of the city and other funding sources within it (banks, international organizations, etc.) secretly and clandestinely.

**The city provides organizations with a defense, given the limited freedom of action armies have within a city**. Cities are thought of, to a great extent, as areas that allow only limited military action under international law. Fighting within a city is likely to damage international public support for military action, and in so doing to limit the military freedom of action within it. This situation strengthens the city as a shield for organizations and their combatants and encourages organizations to enter cities.

**Alongside these trends, broad urbanization processes are taking place across the globe, and are causing cities to grow in size and for weaker populations to move there**. These processes expand built-up areas and reduce the “military playing fields” where armies can fight outside of cities. For example, the Damascus basin today, between the border of the Golan Heights to the city of Damascus, is largely urbanized, as is the Gaza Strip. Non-urban areas have been greatly reduced. Furthermore, the process of urbanization and the migration of weaker populations to cities gives the organizations a large human pool from which to recruit supporters and combatants from among these weaker populations in the city, who seek both meaning and a livelihood.

**Building Military Infrastructure within the City**

The entry of organizations into cities requires organizations to build military or semi-military infrastructure within the city. Consequently, weapons depots, training facilities, missile and rocket launching sites, military clinics, tactical HQs for force employment, etc. are located within cities. Additionally, as noted above, the organizational infrastructure is in the process of moving underground, both to hide and shelter from armies, as well as to separate them from the civilian population. This underground phenomenon was not discovered for the first time during Operation Protective Edge, nor is it unique to our area, but the phenomenon is growing. It is possible that soon broad enemy infrastructure will be moved underground (a model of an underground system appears below). Given that cities have underground infrastructure that is already built, of drainage and sewage pipes as well as other infrastructure, basing themselves in cities minimises the work needed to be done by organizations in this context.

For this reason, the IDF needs to deal with the civilian infrastructure that also serves the military forces of the enemy. For example, one can find civilian factories where, next to them, within them or underneath them, military activities or industry takes place; public institutions and schools turn into command and training centers, weapons depots and rocket and missile launch sites; public transportation systems are put at the service of the organizations and residential neighborhoods turn into warfare zones of fortified rocket and missile launch sites.

Another characteristic that exists in a similar context, is the mixing and blurring between organization members and the civilian population who are not directly involved in combat. The entry of organizations into cities enables their members to conceal their identity and thus to prevent the distinction between them and the uninvolved civilians – during both warfare and routine periods. Consequently, for example, one can find guerrilla fighters without uniforms or military symbols, who can easily pretend to be innocent civilians.

On the one hand, the movement of fighting into cities enabled the organizations a convenient field of action, which grants an advantage to the defending force, offsets the relative advantages of Western armies, and creates difficulties for Western armies fighting the organizations. On the other hand, cities are today the centers of gravity of semi-military organizations, even more so if the organizations rule that specific area. Consequently, appropriate action within the right cities can bring large and even rapid strategic gains.

**The Challenge of the Strategic Impact of Action within Cities**

An additional outcome of war frequently moving into cities is the strategic impact that accompanies warfare in urban areas. This impact derives from the fact that action within cities is perceived as negative and undesirable when compared with warfare in open areas, due to the extensive damage caused to cities. This damage is often perceived as collateral – that is collateral to the desired damage to the enemy, or the injury of actors who are perceived as uninvolved or protected. This is especially true when talking about capital cities or densely populated areas. Furthermore, cities increase the sensitivity to mistakes in force employment, more so than on open battlefields, given that mistakes are likely to cause heavy damage to the innocent, to our forces, to civilians or to infrastructure.

Infrastructure in the urban landscape with its dense geographical character, make it easy for the mass media to film military activity and to broadcast it globally, thereby increasing the impact of action in a city. This impact is reflected in the local and global publication and broadcast of these images, which therefore have the potential to influence global public opinion and the freedom of action of armies. This potential is likely to have a negative influence on the legitimacy of armies to employ force, and even more so when stories are broadcast about collateral damage, which is often impossible to prevent. Moreover, action within cities creates challenges for the combatants and complicated situations from an ethical perspective, which makes it even harder to employ force.

We would emphasize that this phenomenon is not unique to the IDF, with a good example being the difference between the two American wars in Iraq. The first war in 1991 took place mainly in the desert, with some bombing of cities, while a decade later in 2003, the second war took place almost entirely within cities – we mostly remember the battles of Fallujah and Baghdad.

In the Israeli context, the recent conflicts of the State of Israel show that when military action takes place in cities, and certainly where there is extensive damage and injury to refugees and civilians, international involvement in the conflict has an influence. Some of the time we have an interest in this involvement, but mostly it damages the legitimacy of the State of Israel to employ force and damages the freedom of action of the IDF.

In summary, the city has turned from a factor that drew minimal attention from the IDF, to the primary combat zone in which we are active today. The unique characteristics of the city, in the broad strategic context, create challenges for military force employment, and require force employment and generation to be adapted to this reality.

**The Underground Realm as a Complex Operational System**

Exploitation of the underground realm for operational purposes exacerbates the challenge of fighting in cities. The following diagram shows an imaginary model of an underground warfare system, which is not based on any specific intelligence, but on assessment of how such a model could look.

[No diagram included]

**Model of a Complex Underground System**

The model presumes that the technological development of capabilities to build underground infrastructure can create a situation where most enemy infrastructure will be underground, in a manner that amplifies the challenge to our forces. The enemy can locate the following facilities underground: factories and storage facilities, clinics and residences, headquarters and combat positions, and of course missile and rocket firing sites. In practice, the underground realm can be used not just for concealment and movement but can also serve as the operational center of gravity of the organizations and therefore the center of warfare.

An underground operational system located under a city can make the operational theatre even more complex. In order to reach the underground system, one must frequently pass through a totally civilian and urban space populated by those not involved in the fighting. The difficulty of penetrating through an open space is familiar to anyone dealing with the military or even diplomatic craft. The need to penetrate to the underground space further amplifies the operational challenge due to several reasons: the first reason is the increased density of the operational zone, which makes every zone larger, creates more operational problems, and increases the number of resources required and the number of different forces. Another reason is the negative strategic impact created when fighting in this space. This is because the complexity increases when fighting in this space, and as a result, more time is required and the collateral damage to civilians increases.

**Summary of the Historical Surveys, their Significance and Conclusions**

The survey of the Industrial Revolutions, the survey of the different periods of conflict between Jews and Arabs in the Middle East, the survey of precision weapons and the survey of urban warfare, connect to one another. They enable us to describe the changes that have occurred in warfare in recent years from several different perspectives, and the way that conflicts are conducted today. The second Industrial Revolution shaped the way that the IDF and other western armies are structured and work, but in recent decades the act of war has changed, and armies need to adapt themselves to these new circumstances – this is the result of technological developments (the fourth Industrial Revolution) and political changes. To summarize this chapter, we will describe several phenomena that serve as interim conclusions and which are the result of the changes that we have described.

**The First Phenomenon – The reduced strategic value of territory**

The first phenomenon derived from these changes is a reduction in the military-strategic value of territory. In the periods where military maneuver was the primary military activity, territory had tremendous military importance, and frequently military missions were formulated in terms of space. For example, during the Six-Day War, GOC Southern Command ordered his forces to reach the Suez Canal, and in the First Lebanon War the order was given for the: “IDF to destroy the terrorists on the Awali, Hasbani [Rivers…] and to join up with the Christians in Beirut.”[[29]](#footnote-29)

During our current period, it is not important to reach a specific location, even if there are many armies, especially Eastern armies, that are attempting to renew this field with an approach called Anti-Access/Area Denial (A2/AD), that is to prevent access to a particular area. Under this approach, military capabilities are being developed to prevent both manned and unmanned forces from reaching a particular area, through the development of detection and identification tools and long-range precision destructive weapons with ranges up to thousands of kilometers. These capabilities are not a part of the arsenal of the organizations that the IDF or other western armies are currently dealing with.[[30]](#footnote-30) The military importance of territory derives only from the fact that this is where the problem is located, but capturing the territory itself is not a part of the military mission. However, it should be emphasized that the tactical value of territory has not changed. Today, as in the past, an operational force seeking to undertake ground action in a territory must relate to it. That is, the operational force will plan the action and implement it while taking into account territorial analysis and identification of territorial features such as the dominant terrain, kill zones and key areas. As such, the military consensus in relation to territory has not changed, just as the weather still influences aircraft or naval vessels.

The difference between the past and the present regarding the importance of territory can be expressed through the emphases placed when defining the mission of a ground force: in the past a force would mainly ask “Where do I need to get to or maneuver to?”, and only afterwards would ask “What do I do there?”. Today, the primary question is “What needs to be done?”, that is, what problem needs to be dealt with, and the secondary question is where to go and how to get there.

**The Second Phenomenon – Changes in the balance between the principal approaches: attrition warfare and maneuver**

The second change involves the priority that is now being given to wearing down the enemy through precision weapons and smart bombs, special forces, and defensive systems, etc. and not to the maneuver approach. To clarify this, we will explain the two theoretical-doctrinal approaches to military force employment: the attrition warfare approach and the maneuver approach.

Attrition or wearing down[[31]](#footnote-31) is acting to gradually reduce the effectiveness of a military force. Reducing the effectiveness is done by the physical destruction of assets: soldiers, vehicles, weapons, buildings, etc. According to the attrition approach, the key objective in war is to cause the greatest possible losses to the enemy in terms of life and combat means and in so doing to achieve strategic results – from deterrence to a decisive defeat. Maneuver is a form of action that espouses taking the initiative and offensive action, whose purpose is to force the enemy off-balance, and in so doing to defeat them, even without the physical destruction of its military forces. Maneuver sees reality as a dynamic system that is multidimensional (air, sea, ground and knowledge) and is focused on the interaction between force, time and space, and the manner in which they can be utilized to surprise the enemy and defeat them. According to the maneuver approach, combat itself, in the sense of the physical destruction of enemy forces, is only one of the ways to employ military force to achieve strategic objectives. In place of combat it is possible, for example, to transport military forces to a particular location, and in so doing to threaten the enemy with force to such an extent that it loses its resolve to fight. Furthermore, the key to success according to the maneuver approach is initiative, and any strategic result – from deterrence up to a decisive defeat – is achieved through physical surprise or by directly influencing the physical world.

It is customary to think of attrition and maneuver as two approaches that complement one another, and the discourse between these two approaches is central to building the strategic and tactical context of military force employment. Before a war breaks out, these two approaches oppose one another, but with the opening battles, they complement one another. That is, choosing one without the other will cause significant harm to the ability to achieve strategic results. A clear preference for one approach over another – attrition over maneuver or a maneuver over attrition – creates a problem for force employment. For example, physical maneuver towards an enemy headquarters must also be accompanied by the physical destruction of enemy forces or at least some of them. However, destruction alone is not effective, it must be accompanied by surprise tactical moves.

For the purposes of our discussion, the impact of attrition is a weakening of the enemy’s power through constant harassment and wearing down, until the enemy reaches a level of strategic weakness, while the impact of maneuver is movement and military subterfuge to achieve strategic objectives. Force employment based on the precision weapons family appears more promising and simpler to political leaders, given that it guarantees control, early forecasting and all the advantages described above of precision weapons. The conceptual impact of precision weapons is even deeper and is noticeable in two different ways: the size of the expectations and the changes in priorities. The ability to target strategic objectives – almost in any weather conditions, at any point on the globe and almost any time, with the only limitation being intelligence – has created enormous expectations among leaders, and is not surprising that they are willing to allocate vast resources to these weapons.[[32]](#footnote-32)

The precision weapons family can serve armies using both the attrition and maneuver approaches, but their employment in recent conflicts tends towards attrition over maneuver. Precision weapons have been employed as a tool to harass the enemy and destroy it, and in certain cases have even employed an approach of strategic bombing. In practice, force employment using the maneuver approach has almost been neglected, and an imbalance in force employment has been created between the maneuver approach and the attrition approach in favor of the latter.

Force employment based on precision weapons fired from afar – without the need to cross the borders of sovereign states – seems more promising and simpler to political leaders. It frequently even enables leaders to deny any involvement in the action, and their use is therefore preferred over maneuver which is often perceived as a grave escalation. Consequently, the enormous expectations from precision weapons have created a creeping deviation in the allocation of resources. The allocation now favors the attrition approach, given that it is based mainly on the use of precision weapons and neglects the maneuver approach.

This deviation towards the attrition approach is likely to lead to the stagnation of military thought. This stagnation derives specifically from the military ethos, in which military personnel have a geostrategic understanding when solving operational problems, and this understanding is based on the lessons from the past. The problem is that familiarity with the past is now insufficient to enable an understanding of the present or the future. An overdependence on studying the past produces the understanding and conception that the combat meeting has not changed, the battle between the ‘blue’ force and the ‘red’ force will always be the same battle, exactly as it has been since the dawn of time. This dependency on the past has two negative consequences: the first, quite a few armies have stagnated, based on a presumption that reality would indeed arrange a nostalgic meeting of this type for them. The second, is the building up of one service only – which will lead to a struggle for resources – while hoping that just a little more investment of the same type in the same service would lead to a solution (for example, one more bomb and we are done; a little more precise intelligence, and we will solve the problem).

In practice, an imbalance was indeed created between the two approaches in favor of attrition – this is a genuine strategic danger. An expectation has been created of a standalone attrition solution, when time after time reality provides proof that armies that rely on the attrition approach end conflicts without clear results, despite the technological differences between the strong – who continue to strengthen and close themselves off – and the weak.

This revolution brought an explosive conceptual wave that changed the balance between the attrition solution and the maneuver solution on the battlefield, and which has already created a lack of operational equilibrium. One of the first results of this lack of equilibrium is that anything not included in the precision weapons family is likely to be discarded. This is not a marginal phenomenon, given that without balance between attrition and maneuver, these two basic approaches are likely to be weakened.

The question that should be asked is – how to integrate the asymmetric outputs of the precision weapons family within all the services – not only has this question not been answered well but, as we have explained, the development of concepts and capability building in the attrition field has multiplied.

**The Third Phenomenon – Modern Friction**

Clausewitz coined the term ‘friction’ to describe the difficulties in managing an actual war – all of those difficulties on the battlefield that make it hard to effectively utilize military power, such as tiredness, confusion, technical and logistical difficulties, dust and smoke, etc. However, as with every ancient phenomenon on the battlefield, in recent years we have also witnessed a new implication of the phenomenon of friction, that makes it difficult to fully maximize the attrition approach. This friction is the collateral damage that is created due to the need to fight in areas with civilian populations, which are the most common combat environments today. This is not expected to change in the coming decades due to the acceleration of urbanization.

With aerial warfare, collateral damage is likely when there is widespread use of aerial ordinance in a civilian environment. In naval warfare, collateral damage is likely to be caused due to a lack of distinction between naval and civilian vessels – a distinction that in the past was obvious and today is disappearing. Similarly, cyber warfare has the capability to cause heavy damage to civilian infrastructure – from disruptions to electricity and water supplies leading to irreversible damage to hospitals and the patients within, through to total chaos in transportation systems and including the paralysis of the financial system.

The precision weapons family appears to allow one to overcome the challenge of collateral damage. In our day and age, it is possible to fire a missile with dozens of kilos of deadly explosive material at a range of hundreds of kilometers with an accuracy of dozens of centimeters from the target, and while the missile is in the air to follow it with video in real-time. When needed, if for example civilians are discovered near the target, the missile can be redirected from its trajectory, and exploded in the air, to ensure that it does not explode at the target.

However, the ground forces are still making widespread use of forces and weapons that are not precise, which leads to more frequent collateral damage than with precision weapons. These ground forces armaments – combat units, artillery, etc. – are not precise, they cannot be accurately controlled, are not focused and cannot guarantee success even when they are employed in large quantities. A clear example of this is artillery whose employment is greatly limited in operations within dense civilian populations and the armored formations that were used during the Lebanon Wars.

**The Fourth Phenomenon – the double problem of traditional ground forces**

We will now describe the double problem of ground forces. The first problem is the lower strategic-military value of capturing territory as described above. This lowered value reduces the value of ground forces, given that they are intended to capture territory. What value do maneuver ground forces have, if territory will in any case be returned and it is seemingly possible to achieve the same results with stand-off fire?

The second problem is the inherent complexity of employing ground forces which causes a clear tendency to employ aerial force.[[33]](#footnote-33) Ground forces deal with the friction phenomenon[[34]](#footnote-34) – in general, and specifically in the context of collateral damage – at a higher level, given that the manner in which they are employed on the ground requires more time and relatively greater resources than others to achieve results. The immediate implication of this is reduced operational effectiveness in relation to their strategic value as the conflict continues, and an increasing risk of the divergence of the means required for victory in war. This can be learnt from the Americans during the ongoing warfare in Afghanistan and Iraq, and the IDF learned this in the recent operations in Gaza and Lebanon. This double problem causes ground maneuver to be perceived as vulgar by political decision-makers, and among military commanders it has become a tool with limited legitimacy to employ it

**Between Strategy and Policy**

Changes to strategic objectives before and during war: it is customary to say that war at the tactical level is the realm of uncertainty, and is chaotic and rapidly changing, while at the strategic level it is far more stable. However, as described above, the changes in warfare have also brought the chaotic nature and frequent changes to the strategic level, and consequently policy is also likely to change rapidly. Even if the political and military leaders do not announce changes to war objectives, in practice the strategic results to be obtained will differ.

Whenever there is a need to fight in several political arenas concurrently, different military strategies are required to achieve the goals. What is correct for one political framework will not be correct for another; whether internal politics require one thing and superpower politics require another; or whether the international arena requires yet another. Consequently, politicians are more involved in the need to change the strategic goals during war to retain diplomatic and political freedom of action. This obviously creates a challenge at the tactical level, especially as not all formations in all dimensions are able to provide a response to rapid changes of this type.

**Between Policy and Tactics**

At the center of this phenomenon lies the strategic resonance caused by the tactical world which is represented by the notion of a “Corporal Strategy”. In the past, it took time for this strategic resonance to reach the public sphere, whether we are talking about victory or defeat. Today however, policy is directly and immediately exposed to the tactical execution whether before, during and of course afterwards (just as before). This direct connection stimulates the rapid involvement of the political echelon in the action on the battlefield in contexts that can impact policy. Given that policy in this field deals with politics, the tactical interpretation of a military act becomes a tool in its own right, for good or for bad, to show, for example, whether an action adheres to international law or not, among other issues. Political leaders no longer stand on the sidelines in relation to military action. They become involved, even in the choice of execution methods in order to see whether they are appropriate to policy needs in real-time. In this way we can perceive humanitarian ceasefires as tactical-political tools whether during the operations in Gaza or the civil war in Syria (a tool that the Russians have made frequent use of).

**Between Tactics and Strategy**

This is seemingly a classic issue that has been endlessly analyzed in the professional literature, however it too has undergone a large change. The organization of the combat space is the foundation of military thinking and enables the organization of the forces, their employment, synchronization with the context and finally measurement of the expected and accumulated operational outputs. In an age when wars were conducted by regular armies and warfare took place in open spaces, the organization of geographical space was the primary distinction for the deployment of the different ranks and defining the mixture between defense and offence. According to most approaches, low ranked forces fought at the front, while the senior ranks worked at the rear. This is how the IDF response was also shaped – the maneuver forces.

The phenomena that we see here are as follows:

* **An increased need to change tactics to provide an immediate response to changing strategic needs. This can even reach the point where completely different ground objectives need to be reached.**
* **An increased need to synchronize all the dimensions according to their relative advantages in relation to the mission. The key implication of this phenomenon is the growth of headquarters to synchronize the forces and a blurring of the traditional military boundaries between force generation and force employment bodies within the services.**
* **The need for new operational tools adapted to the strategic needs due to the need to fight in new dimensions.**

One implication of this is that the Chief of Staff (and the relevant generals in the General Staff Forum) are called upon by the political echelon to many more meetings and for longer times during the day. A second implication is the fact that the Chief of Staff (and also the relevant generals in the General Staff Forum) must deal with issues that are not strictly military, and the entrance of the IDF to the broader-strategic level.[[35]](#footnote-35)

We would like to draw the focus of this discussion to the third implication, which is the increasing expectation of the political echelon for a rapid operational rhythm, in a manner that serves the rhythm of the strategic events. As we have noted, this is almost completely impossible to achieve during ground operations, and we must work towards solving this issue with the political echelon. A lack of balance and the avoidance of dealing with this issue could bring about a situation in which the political echelon gives an order for a particular action, but before it is executed, the political echelon has already changed the decision, due to changes in the strategic world, and the political echelon expects a similarly rapid response from the army.

We will demonstrate this point with historical examples. When Prime Minister Golda Meir discussed crossing the Suez Canal during the Yom Kippur War, the discussion took place without command and control aids to present the situational picture, which would have appeared genuine, and took place with a relatively slow pace of strategic events. At the moment that Prime Minister Meir made her decision, it was clear that the decision to cross the canal would take several days to implement. In contrast, during the Second Lebanon War, when the Prime Minister Ehud Olmert made decisions about military operations with his Chief of Staff, and ordered their execution to be completed within a few hours, he was disappointed when they were not executed within the set timeframe. Furthermore, during the time that these operations were not implemented (because more time was needed to prepare them), the strategic picture had already changed, to the point where the decisions were also changed, and to the point where the IDF was ordered to engage in different actions. This phenomenon was also reflected in the orders the Chief of Staff gave to Northern Command.[[36]](#footnote-36)

The bottom line is that the rhythm of operations, certainly ground operations, is not increasing, at a time where the political echelon expects them to. Furthermore, the faster rhythm of strategic events and the information (raw data and partial data perceived as being full) that leaders receive, is causing the acceleration of decision-making and constant changes. The IDF must familiarize itself with these phenomena and prepare for them.

1. There is a debate amongst armies across the globe about how many combat dimensions exist. In the IDF is customary to talk about several combat dimensions: ground, aerial and space, naval and information. In the US Armed Forces, in recent years it has been customary to divide the aerial dimension from the space dimension. For a detailed discussion see: *The Foundations of Military Action*, Operations Directorate-Training and Doctrine Division, July 2006, pp. 91-93 [Hebrew]. [↑](#footnote-ref-1)
2. Malware are malicious computer programs that interfere with the functioning of a computer or breach a user’s privacy. [↑](#footnote-ref-2)
3. Yigal Alon, *The Subterfuge of War*, HaKibbutz Hemeuhad, Tel Aviv, 1990, pp. 283-294. [↑](#footnote-ref-3)
4. Itamar Rabinovich, *The Lingering Conflict: Israel, the Arabs, and the Middle East, 1948–2011,* Saban Center at the Brookings Institution, 2011, [pp 18-24 in Hebrew – need to find English page number] [↑](#footnote-ref-4)
5. Rupert Smith, *The Utility of Force: The Art of War in the Modern World*, Vintage, 2008, [p 225 in Hebrew – need to find English page number]. [↑](#footnote-ref-5)
6. Benny Morris, *Righteous Victims: A History of the Zionist-Arab Conflict, 1881-1998*, Vintage, 2001, [pp. 637-638 in Hebrew – need to find English page number] [↑](#footnote-ref-6)
7. IDF Operations Directorate-Doctrine and Training Division, *The Influence of Computerized Command and Control Aids on the Commander and Staff*, Combat Doctrine Department, 2012, p. 6. [Hebrew] [↑](#footnote-ref-7)
8. According to Benny Morris, *1948: A History of the First Arab-Israeli War*, Yale University Press, 2009, [pp. 40-56 in Hebrew – need to find English page number] [↑](#footnote-ref-8)
9. Ibid, p. 430 in Hebrew – need to find English page number [↑](#footnote-ref-9)
10. The fact that IDF strategy documents must delineate definitions for victory and defeat of the enemy shows how central the challenge of redefining basic military terms is to our current reality. See: IDF Chief of Staff Bureau, IDF Strategy, Unclassified Version, 2015 and 2018 [Hebrew] [↑](#footnote-ref-10)
11. Negative Treatment in all Aspects (NTA). From information operation aspects (damage to trust) to the physical (killing). [↑](#footnote-ref-11)
12. As result of this fire, American forces were diverted into action in the area of the Iraqi H1 and H2 air bases. [↑](#footnote-ref-12)
13. Similarly, the term “human terrain” is analogous to and could even replace the term “field warfare”. [↑](#footnote-ref-13)
14. This definition of capturing territory is valid till today in the IDF (Dictionary of IDF Terminology, p. 256) [Hebrew] [↑](#footnote-ref-14)
15. See: http://www.designation-systems.net/dusrm/m-109.html [↑](#footnote-ref-15)
16. An example of this was Operation Density, during which the Israel Air Force destroyed most of Hezbollah’s heavy and long-range rocket array at the start of the Second Lebanon War (2006), in an operation that took just a few hours. [↑](#footnote-ref-16)
17. I would suggest leaving this footnote out in the English version [↑](#footnote-ref-17)
18. See the survey of active defence systems against missiles developed exclusively by the IDF: Saul Bronfeld, “Naval developments – the Missile Boat Flotilla”, *Dado Center Journal*, December 2014, pp. 31-54. [Hebrew] [↑](#footnote-ref-18)
19. The decision to develop the Iron Dome system was reached after the Second Lebanon War as part of the lessons of the war. Israel State Comptroller, *The Process of Decision-Making to Develop and Procure an Active Defence System Against Surface to Surface Rockets (SSR)*, Annual Report 59A for 2008, 2 March 2009, p. 12. [Hebrew] [↑](#footnote-ref-19)
20. The development of precision weapons was not the exclusive province of the IDF, as was described above in the historical survey. [↑](#footnote-ref-20)
21. Mau Tse-tung, Selected Military Writings, pp. 217-218, quoted in: Michael I. Handel, *Masters of War: Classical Strategic Thought*, 3rd Edition, 2000, pp 4-5. [↑](#footnote-ref-21)
22. Harry R. Yarger, *Strategic Theory for the 21st Century: The Little Book on Big Strategy*, 2006, p. 58. [↑](#footnote-ref-22)
23. IDF General staff, General Collection, 1-2. *Combat Doctrine*, Volume A, 1964, clause 123. [Hebrew] [↑](#footnote-ref-23)
24. Shimon Golan, *War on three fronts: Decision-making in the Israel High Command during the Six-Day War*, Ma‘arachot, Tel Aviv, 2007, pp 213, 218-219. [Hebrew] [↑](#footnote-ref-24)
25. Elhanan Oren, *The History of the Yom Kippur War*, IDF History Department, Tel Aviv, 2013, pp 506-515. [Hebrew] [↑](#footnote-ref-25)
26. The War of Independence was the exception to this, due to the extensive combat within cities, and from this perspective it belongs in the first period, which is similar to the third period in terms of combat within cities. [↑](#footnote-ref-26)
27. This phenomenon is not new to history, and is, to a certain extent a return to ancient customs. In this context, we can note the action of the ancient Jewish zealots in Jerusalem, Yodfat, Gamla, Beitar and additional cities, who fought the Romans before the destruction of the Second Temple. [↑](#footnote-ref-27)
28. Yigal Henkin, *The Rhodesian Army and Warfare Against Subversion: Searching for military excellence*, Doctoral Dissertation, University of Bar Ilan, Ramat Gan, 2009, p. 342: “violence ]of the guerrillas against the population[ is one way to push the population from simple political sympathy to active support […] or passivity”. [↑](#footnote-ref-28)
29. Operation Peace for Galilee Order, IDF Archive, 306827382. [Hebrew] [↑](#footnote-ref-29)
30. https://warontherocks.com/2017/01/demystifying-the-a2ad-buzz/ [↑](#footnote-ref-30)
31. Within the IDF this approach is called wearing down – Operations Directorate-Doctrine and Training Division, *Basic Operational Doctrine*, IDF General Staff, 2006, pp. 72-73. The British Army refers to this approach as attrition. [↑](#footnote-ref-31)
32. The Strategic Defence Initiative against missiles, known by its nickname “Star Wars”, was meant to cost the American taxpayer $90 billion over 15 years*. Strategic Defence Initiative: 15-Year Funding Requirements* (United States General Accounting Office, Fact Sheet for the Chairman Committee on Armed Services, House of Representatives, February 1992). [↑](#footnote-ref-32)
33. On the major differences between ground forces and aerial means see Meir Finkel, “The Worship of Technology in the IDF”, *Challenges and Tensions in Force Generation Processes*, Ma’arachot, Tel Aviv, pp. 194-195. [Hebrew] [↑](#footnote-ref-33)
34. See a detailed account of the phenomenon of friction on the battlefield: Operations Directorate-Doctrine and Training Division, *The Foundations of Military Action*, IDF General Staff, 2006, pp. 94-99. [Hebrew] [↑](#footnote-ref-34)
35. This phenomenon has also occurred due to the weakness of the strategic staff bodies in the State of Israel, and the entry of the IDF into these fields, see Alon Paz, “Generals are from Mars and Politicians from Venus”, *Ma’arachot* 437, June 2011; Adamski, 2012, op. cit., p. 192. The focus here, as with these sources, is on the implications for the IDF, which needs to broaden its thinking, and not just about the phenomenon itself. [↑](#footnote-ref-35)
36. Ehud Olmert, “The Second Lebanon War – Looking Back”, *Army and Strategy* 6, Volume 1, March 2014; *Chivalry Requires It: the 35th Brigade in the Second Lebanon War*, IDF History Department, 2013. [↑](#footnote-ref-36)