**Israeli Air Force Effectiveness**

**During the Second Lebanon War (2006)**

In September 2006, about a month after the end of the Second Lebanon War (2006), a governmental commission of inquiry into the events of the war was established in Israel. The committee's report was published in January 2008, read as follows:

“On July 12, 2006, at 9:00 am, Hizballah fighters attacked an IDF patrol on the northern border, killing three, wounding two, and abducting two others - Udi Goldwasser and Eldad Regev. A tank that was brought into Lebanon to foil the kidnapping was loaded with a bomb, and four fighters were killed. A soldier in the rescue force was also killed. Eight IDF soldiers were killed, two wounded and two kidnapped, shortly after an incident near Kerem Shalom, in which Gilad Shalit was kidnapped.

At 22:30 that night, after a two-hour meeting, the Israeli government unanimously decided to go to what became the Second Lebanon War. **The government did not want war, did not intend to start a war, and did not know that it was going to war**. Only on March 25, 2007 did the government decide to call the military campaign of the summer of 2006 'war'. However, this was the significance of the decision of July 12. For 34 days, from 12 July to 14 August 2006, the war continued. **IDF forces, especially the IAF, dealt heavy and painful blows to Hizballah and Lebanon**. IDF forces attacked the enemy positions along the Lebanese border, and there were ground raids by IDF forces and an extensive ground operation in the last two days south of the Litani River… At the same time, **Hizballah fired thousands of rockets at the northern part of Israel**. Many of the residents of northern Israel, those who did not abandon their places of residence and wandered to the center and south of the country, lived in bomb shelters during most of the war. The IDF succeeded to a great extent in overcoming the rockets from medium and long ranges but failed to reduce rocket fire from close range.

In the 34 days of fighting, one hundred and sixty-four people were killed in Israel, one hundred and nineteen of them soldiers and forty-five civilians. In addition, many were wounded. Thirty-three of the fighters were killed in the last two days during the ground operation. Nearly 4,000 rockets fell on northern Israel. Heavy economic damage was caused to Israel. The extent of the damage and losses to Hizballah from the war were severe. Hundreds of its soldiers were killed and its strategic capabilities were damaged. Its center in the Dahiya neighborhood of Beirut was destroyed. Many Lebanese civilians were also severely hurt in Lebanon. ... During the first period of the war there was widespread support in Israel for the government and its decisions. **As time passed, the criticism intensified** ... On August 14, at 8 am, the cease-fire went into effect and was carefully guarded.

A prolonged **war initiated by Israel ended without Israel winning militarily**. ... The rocket fire on the home front continued throughout the war, until the very last moment, and was stopped only because of the cease-fire. The fabric of life in the area, which was under rocket threat, was seriously disrupted, and a large number of residents ... left their homes. **A quasi-military organization of thousands of warriors managed to stand for many weeks before the most powerful army in the Middle East**, enjoying absolute air superiority and great advantages in size and technology gained victory/ended the war. **This has far-reaching implications for us**, as well as for our enemies, neighbors and friends in the region and in the world. **Taking this intio consideration, it is not difficult to understand the strength of the waves of protest that arose following the war**.”[[1]](#footnote-1)

Considering these harsh criticisms of the conduct of the IDF in the war, and in light of the centrality of the IAF in this campaign, the purpose of this study is to examine the effectiveness of the IAF in the 2006 war against Hizballah, and thus to learn about the effectiveness of the AIF in a war against a non-state military actor. The article will present the circumstances and conditions leading to the Second Lebanon War, examine how the AIF operated in the war, its achievements and failures, the lessons derived by the AIF, and conclusions regarding the operation of air power in future conflicts with similar characteristics.

Historical background

Lebanon was established as an independent state in 1943, with different populations. Although all Lebanese were Arabs, the main population groups in Lebanon were Christians, Druze, Shiite Muslims, Sunni Muslims, and after 1948 Palestinian refugees. In the 1970s, Palestinian terrorist organizations were based in Lebanon and from there they embarked on terrorist attacks in Israel. In the summer of 1982 IDF forces captured southern Lebanon and the capital of Beirut during the First Lebanon War, after years of terrorist attacks and Katyusha bombardments on the Galilee. In June 1985, Israel evacuated Lebanon, but returned IDF forces to Lebanon in 1987 in order to defend the Israeli-backed South Lebanon Army (SLA) from collapse and established a "security zone" to serve as a buffer where the terrorist attacks would stop and thus be contained. During the years in which the IDF stayed in Lebanon until its retreat in 2000, various organizations fought against IDF and SLA forces. From the early 1990s the Hizballah organization became the IDF's main enemy in Lebanon.

Hizballah, the “Party of God”, was established in 1982 as a union of religious Shiite movements supported by the Iranian Islamic Revolutionary Guard Corps (IRGC). In its early stages (1983-1986), the organization operated mainly through various methods of terror: suicide bombing attacks (35 cases), placing explosive charges, shooting ambushes and abduction of foreign soldiers and diplomats. In November 1990, a cease-fire agreement was signed between Hizballah and the Amal organization, after which Hizballah forces returned to southern Lebanon to fight against Israel. Hizballah was reorganized with the help of the Iranian IRGC as a professional regular military force. Several hundred soldiers were divided according to their professional expertise: intelligence, offensive operations and rocket firing capabilities. These forces were backed up by local militia forces, who were reservists. Since then, Hizballah has become the main military organization in southern Lebanon, gradually changing its patterns of military activity from terror to guerilla warfare, alongside an extensive social and political campaign. Hizballah's political objective was to occupy southern Lebanon. The method used by the organization was based on ceaseless fighting at low intensity to exhaust Israel and to destroy the SLA.

Israel's political goal was to withdraw from Lebanon in exchange for an arrangement that would ensure the northern border from terrorist attacks. The IDF's basic method was defensive warfare, when IDF and SLA forces tried to thwart enemy activity by absorbing as few casualties as possible and with as little effort as possible. On two different occasions Israel embarked on deterrence operations based on the relatively massive use of air force and artillery, and minimal use of ground forces maneuver, to prevent Hizballah from firing rockets against Israel.

Operation Accountability (July 25-31, 1993) was based mainly on air strikes (about 1,000 sorties), raids by Special Forces and artillery fire. As a result, 300,000 Lebanese refugees left the south towards Beirut. Until the end of the operation, 118 Lebanese were killed, of whom 50 were Hizballah members. Israel suffered five casualties (three of whom were soldiers). Lebanese infrastructure was severely damaged and at the end of the operation a cease-fire agreement was signed in which the sides agreed to refrain from firing at civilian population.

Three years later, following the relatively massive firing of Katyushas on Israel, the IDF launched another operation, the Grapes of Wrath (11-27 April 1996). The operation was intended to return to the status quo, the means used were to attack civilian infrastructure and cause economic damage to pressure the Lebanese and Syrian governments to instruct Hizballah to renew the ‘accountability’ agreement. The operation was based again on the air strikes, artillery fire, and special forces raids primarily to pinpoint targets. The IDF imposed a naval blockade on Lebanon, and on 14 and 15 April 1996, electricity stations were attacked in the area of Beirut (Jumhur and Salam). The days of the operation were characterized by a lack of intelligence about Hizballah's targets and in weather conditions that made it very difficult to carry out air strikes (10 out of the 16 days of the operation had more than 6/8 clouds). During the operation, three IDF soldiers, 19 Hizballah soldiers and 180 Lebanese civilians were killed, and some 350,000 Lebanese civilians left their homes.

The IAF's inquiries the Operation Grapes of Wrath expressed frustration at the low achievement in the fighting against the Katyushas. IAF’s commanders noted that “in the war against guerilla warfare, according to what we learned in the operation, we cannot win by air force ... What an air force knows how to do is to strike in a painful place ... I have a feeling that it is unpleasant for us to say to the chief of staff or the political leaders that solution to the Katyusha rocket fire on northern Israel is not in the Hizballah field, but rather, we must go to places where we can express ourselves. This is infrastructure in Lebanon, and this the supply routes from Syria to Lebanon”.[[2]](#footnote-2) Many agreed, including Air Force Chief of Staff Dan Halutz, who would be the IDF chief of staff a decade later in the Second Lebanon War: "I think we should reduce the treatment of Katyushas ... be willing to absorb some of them, Do everything possible, but do not make it our main task. ... We need to expand the targets for a painful attack, the so-called disruption of life in Lebanon”. [[3]](#footnote-3) It was clear to the participants that in the future there would be another military operation in Lebanon, and that the preferred mode of operation would be air force strikes without the entry of ground forces to occupy areas in Lebanon.[[4]](#footnote-4)

The continuous fighting in the security zone, which seemed futile, repeatedly provoked public debate in Israel about the IDF's purpose in staying in southern Lebanon. In the spring of 2000, Prime Minister Ehud Barak ordered the IDF to withdraw from Lebanon unilaterally and without a political settlement. The SLA ceased to exist, and IDF forces retreated and redeployed along Israel's international border. This was presented by Hizballah leader Hassan Nasrallah as a victory and a model for the future: “I tell you: this "Israel" that owns nuclear weapons and the strongest air force in this region is more fragile than a spiderweb.”[[5]](#footnote-5)

The uniqueness of Hizballah was the combination of military capabilities, methods of operation, and the political-social organization. Hizballah had advanced capabilities of a regular army, including command and control posts, advanced communications systems, regional units of well-trained warriors, and advanced weapons such as 2000 anti-tank missiles, anti-ship missiles (C-802) and unmanned aerial vehicles. Hizballah was able to raid through special forces, and over the years many infrastructures were built, some underground, including headquarters, rocket launching sites, and combat positions. When his forces encountered IDF forces, his main mode of action was guerilla warfare, namely, the preservation of force and the avoidance of exposure and contact with the IDF, especially the Air Force, as Nasrallah noted: “Those who do not have the ability to defend themselves in confrontation with the enemy can reduce the importance of its air force by hiding and avoiding overt appearance ... preventing the enemy from identifying targets causes the air force not to do much.”

Additionally, Hizballah operated with the logic of a terrorist organization, that is, harming civilians to intimidate and create pressure that would change Israel’s policy, mainly by launching rockets at population centers.[[6]](#footnote-6) In the period between the IDF withdrawal from Lebanon and the outbreak of the Second Lebanon War, the Hizballah continued to grow, and most of its efforts were directed in equipping many rockets. While in 2000 Hizballah had more than 7,000 rockets, in 2006 it already had 14,000 rockets. Hizballah also established a wide array of social institutions (mosques, clinics, schools), mainly in the Shiite area of ​​Lebanon, and became a political party with representation in the Lebanese parliament.

Other factors influenced the war in the summer of 2006 and the way it developed. In September 2000 the ‘Second Intifada’, the Palestinian popular uprising, broke out in Israel, the West Bank and the Gaza Strip, which lasted several years and claimed hundreds of Israeli and Palestinian victims. The focus of Israeli military activity shifted to the Palestinian conflict, which led to Israel's unwillingness to open a second front on the northern border. Moreover, since the IDF was primarily engaged in suppressing the Palestinian uprising, the ground forces hardly practiced a full war scenario. Therefore, a Hizballah attack on Israeli patrol on Mount Dov in October 2000 and the abduction of three soldiers did not lead Israel to a war against Hizballah. Israel's lack of response to the incident was in fact a ‘containment policy’ in Lebanon, in which the Israel refrains from launching a war against Hizballah.

Following the assassination of Lebanese Prime Minister Sa'ad Hariri and the international criticism against Syria, the Syrian forces retreated Lebanon in April 2005. Israeli plans for a war in Lebanon, which included exerting pressure on Hizballah by harming the Syrian forces, became irrelevant. In August 2005, Israel withdraw the Gaza Strip, and Nasrallah noted that Israel was becoming more and more vulnerable to military pressure, and therefore it should continue to be pressured. On June 25, 2006, an IDF tank was attacked near the Gaza Strip fence, three soldiers were killed and one soldier, Gilad Shalit, was kidnapped as a hostage by Hamas. The IDF began an offensive operation in the Gaza Strip, based on air strikes, targeted killings and ground raids to press Hamas to return the abducted soldier (who was returned only after five years and lengthy negotiations). Two weeks after the attack and the kidnapping in Gaza, Hizballah attacked an IDF patrol on the Lebanese border, which would later become the starting point of the Second Lebanon War.

The opening of the Second Lebanon War

Immediately after the attack on IDF soldiers on the morning of 12 July 2006, Israeli Air Force aircrafts attacked Hizballah posts deployed along the border, bridges and blocked the routes leading from southern Lebanon to the north on a pre-prepared order for such incidents. At a meeting headed by Chief of Staff Halutz, it was decided to recommend a change in policy to restore Israeli deterrence, to attack Lebanese infrastructure targets, and to carry out attacks on Hizballah.[[7]](#footnote-7)

At a meeting held by the defense minister at 14:30, the main issues were: who to focus most of the operation on - Hizballah, the Lebanese government or Syria, and what were the preferred targets to attack - Lebanese infrastructure facilities or Hizballah 's rocket arsenal. Gadi Eizenkot, Chief of operations, recommended that “not confront Hizballah but with the Lebanese state ... The understanding is that if we confront Hizballah, it will react, and if we’ll hit Lebanese infrastructures, it will create them a dilemma.” The chief of staff agreed with him. However, the head of the Mossad, Meir Dagan, claimed that in the past these operations had already been done without much benefit, and that if the army's proposal were accepted, "we are going to deteriorate into a long-term confrontation, whose potential to hit targets in Israel's home front is very high”. He recommended attacking terrorist targets in Syria, but the defense minister declared that the enemy was Hizballah and therefore it was necessary to act against him. The chief of staff recommended again the attack on power stations supplying up to 50 percent of the electricity in Lebanon, but the defense minister rejected the proposal. Another dispute arose over the attack on Hizballah's medium-range Fajr rockets. The chief of staff and the commander of the air force claimed that they should not be attacked immediately, but only in the next stage of the campaign, in part because an uninvolved population would be harmed (the IAF operations research estimated that the attack would kill between 100 and 400 civilians). The defense minister objected: “The issue of long-range rockets is a strategic matter and a top priority.”

In a continued discussion with the prime minister, the defense minister objected the bombing of infrastructure facilities that “primarily harm the Lebanese population, which mainly does not support Hizballah” and repeated his proposal to attack the medium-range rockets deployments. The prime minister accepted this, adding that damage to Lebanon's infrastructure would incite the international community against Israel, (in part because of the US secretary of state's request not to bomb the civilian infrastructure in Lebanon). At the cabinet meeting that followed, there was consensus among the government members that the operation should be air-only, and soldiers should not be endangered. The military leaders again proposed attacking Lebanese infrastructure as well. Since the defense minister and the prime minister rejected this, the ministerial security forum approved the targets of the air attack, which focused on medium-range rocket launchers without attacking power stations.

Operation Density

Intelligence played a crucial role in the operation planning. In the summer of 2000, intelligence material was collected on Hizballah’s rocket arsenal in Lebanon, which included details of the medium-range rockets and the storage sites of the launchers. Hizballah operated a secret system of storing the rocket array inside ordinary "innocent-looking" homes in villages in southern Lebanon. The Lebanese families who agreed to hold rockets in their homes received payment from the organization and they allocated rooms to store the launchers. Each launcher was aimed in advance at a certain target in Israel so that when necessary they could break one wall in each house to launch the rockets. To obtain this secret information, more than forty special operations of the various intelligence units were required to reach a level of accuracy that sometimes included the room in which the launcher was located.

A joint team of the Military Intelligence Directorate and Air Force Intelligence accurately marked the targets, and a special planning team was set up in the Operations Department for detailed planning and writing an operation order. In October 2000, an operational idea was formulated how to attack the launchers. In 2001, an order was issued called ‘Density’ or ‘Specific Weight’, which included intelligence purposes, targets for attack and armament. The operation order was distributed at the end of 2001 and the Air Force began to practice it in flying models and learned lessons for possible action. When JDAM arrived at the air force, precise coordinates were set for all targets, and the possibility of extensive operation at night and in bad weather was added, while shortening the duration of the attack. The operational idea of ​​the plan was “to destroy a significant part of the medium-range rocket launchers, while creating an effect of ‘intelligence exposure’ and a sense of persecution within Hizballah. This will be done by means of a simultaneous attack, in a ‘preemptive strike’ and in surprise, of dozens of targets in which intelligence estimates that high-quality rockets are found that threaten the depth of Israel”.Since the launchers were found close to the houses of civilians (some inside the houses themselves), the order had four different alternatives, depending on the level of casual damage expected in the attack, and the politicians decided on the preferred alternative. When deciding, they discussed the issue of collateral damage and the attorney general ruled that from the point of view of international law, houses belonging to civilians in which weapons are stored can be attacked, or as the defense minister put it “He who sleeps with a rocket in his house must know that he might get hurt”

The hour of operation was at 4:00 AM and all hits on the targets were accurate. Within 45 minutes, 44 known launchers and hundreds of rockets were destroyed, mainly through JDAM. The surprise was full. Hizballah which did not expect the IDF to attack with such force, thought that the location of the rockets was kept secret. The fact that such a secret project was exposed to Israel was a severe blow and its ability to strike deep inside Israel, in the area between Afula and Hadera, was severely damaged, with two-thirds of the medium-range rockets destroyed (although there were still long-range rockets and others). The number of civilians injured in the attack was smaller than expected, with about 20 Lebanese killed.

For the pilots in the operation it was a great excitement. The squadrons commanders read a special message issued from the air force commander detailing the operation importance and the considerations that preceded its approval. “We felt it was our time, to launch our ‘focus’ operation” [the opening act of the six days war, NH], and the its execution was conducted in an efficient and precise manner, without any threat.[[8]](#footnote-8) It was the culmination of an intelligence and operational effort that lasted more than six years

As the heads of the intelligence services expected in the preliminary consultations for the attack, Hizballah responded by firing Katyusha rockets at the Galilee from the morning. During that day Hizballah fired 125 Katyusha rockets, killing two Israeli civilians and wounding 69. The next day, six Israelis were killed by rockets, and from then on Hizballah rockets were fired almost continuously, and the war against them became one of the main characteristics of the Second Lebanon War. Moreover, as a result, Israel deteriorated into a series of actions and reactions without the Israeli government deciding to go to war. The very decision to carry out operation density, a response that ended the Israeli “containment” policy, meant the beginning of a war of attrition, in which the Air Force played a central role. The Grand finale of six years preparations was the opening line of the war.

Political objectives of the war and the military goals

Since Israel did not go to war but to a large-scale operation based on the air force, the army's plans did not include a transition to an emergency, mobilization of reserve forces and preparations for the decision of Hizballah or the occupation of southern Lebanon.

The government decision states that

“Israel views the sovereign Lebanese government, the responsible party for the action that has taken place from its territory, and the return of the kidnapped soldiers to Israel and demands that it implement UN Resolution 1559. At the same time, there is no doubt that Hizballah, a terrorist organization operating from within Lebanon, initiated and carried out the operation, and Israel will act against the organization in a manner required by its actions.”

From these definitions, the army decreed the objectives of the operation:

“Enhancing Israel's deterrence in the region and shaping a state-to-state relationship with Lebanon: Stopping terror from Lebanon's sovereign territory towards the State of Israel, while pushing the Lebanese government to fulfill its state responsibility - including security control in southern Lebanon and exerting pressure on Hizballah to return the captives, Syria out of the campaign, while reducing the connection to the Palestinian arena.”

The military tasks were determined: the imposition of a naval and air blockade on Lebanon, severe damage to Hizballah (headquarters, senior officers, rockets and weapons), and preparations for a prolonged campaign and absorption on the home front with a parallel effort in the Gaza Strip (and during the first two weeks of the campaign, air and ground operations continued in the Gaza Strip Following the kidnapping of Gilad Shalit).

Bombing infrastructure in Lebanon

From the beginning of the war, the chief of staff saw the bombing of Lebanese targets as the most significant means of achieving the war's objectives and stopping the Hizballah. Because the prime minister did not approve his demand to bomb the electricity stations, the chief of staff estimated that the next day the politicians would approve it because of the expected rocket fire into Israel: “In my opinion, we also must turn down all the power stations”. However, the Prime Minister's refusal to damage the power stations assumed Israel would lose American and international support. Therefore, the chief of staff's requests, which were repeated until the end of the war, to bomb power stations and Lebanese targets on a larger scale to motivate the Lebanese government to “take a stand” were rejected. However, the air force attacked infrastructure targets, but on a smaller scale than the IDF chief wanted in the first place.

Some of the infrastructure's targets were attacked as part of the blockade imposition on Lebanon, which at first was intended to prevent the smuggling of the abductees from southern Lebanon to the north and outside Lebanon and later in the war was intended to prevent Hizballah from acquiring weapons. Beirut international airport was bombed and partially paralyzed on the second day of the war to prevent air traffic to and from Lebanon, and on the following day (14 July), the air force bombed airfields in Riak and Kliat.

To stop the ground traffic to Lebanon, the air force bombed 11 bridges and obstructions on the Beirut-Damascus highway on the second day. Additional bridges were bombed during the war to increase the closure, including bridges on the coastal road between Beirut and Tripoli in northern Lebanon (4.8.2006). Throughout the war, 92 bridges and 430 obstructions were bombed, blocked southern Lebanon to the north and the Syrian-Lebanese border.

According to the chief of staff's instructions, two fuel tanks nearby Beirut (July 14, 2006) and local gas stations, mainly in southern Lebanon and the Beirut area attacked, and a total of 46 gas stations demolished in the entire war.

Bombing the Dahiya neighborhood in Beirut

Since the government refused to destroy infrastructure targets in Lebanon, and the desire to strike Hizballah severely since it continued firing rockets at Israel, the chief of staff suggested attacking Hizballah headquarters in the Dahiya neighborhood of Beirut to shorten the operation. After the Prime Minister and the Minister of Defense approved it, several bridges and intersections were attacked at night in the Dahiya area.

The next day (June 14, 2006), a discussion was held how to damage Hizballah and achieve optimal results, without harming Lebanon's infrastructure. the army endorsement to attack Hizballah security zone in Dahiya was approved by the government. The bombardment began in the evening and collapsed high-rise buildings where Nasrallah's bunker, Hizballah headquarters, television station (Al-Manar) were located and caused great damage to the neighborhood.

In response, Nasrallah announced that Hizballah rockets will be aimed Haifa, and indeed on July 16, 122mm rocket hit Haifa and 8 Israelis were killed. The attacks continued in the Dahiya area on Saturday and Sunday, now the targets were the headquarters of the ‘Shura’ Council (the Supreme Council of Hizballah), the organization's secretariat headquarters, the homes of Nasrallah and Fadallah, the spiritual leader of the organization, and many other buildings. The bombardments in the area continued until the last day of the war, and more than 100 high-rise buildings were destroyed and another 100 were severely damaged, and the entire area was severely damaged.

Another means by which Israel tried to put pressure on Hizballah were attempts to hurt Nasrallah and other leaders. The Air Force had extensive experience in targeted killings of terrorist organizations leaders which began with the assassination of Hizballah leader Abbas Musawi in 1992 (which Nasrallah inherited) and became more sophisticated in the second intifada since 2000. The key to the successful targeted killing was accurate intelligence in real time. In the Second Lebanon War, the intelligence was not accurate enough, and therefore, albeit the air force was available for these missions, and that 450 suspected command sites were attacked, the damage to senior officers was minor.

Additional efforts by the Israeli Air Force to strike Hizballah commanders were raids by special forces. Noteworthy is the incursion in Ba’al-Beq, far in the heart of Lebanon (August 2, 2006) and two days later a raid on the Hizballah local headquarters in Tire. However, despite the boldness of the operation, the forces failed to hit the commanders as the intelligence was not accurate enough.

Attempts to damage the command and control systems and bombardment of Hizballah's communications lines did not paralyze the organization because of its great redundancy in the means of communication, thus Hizballah continued to function throughout the war.

Air Force fighting Hizballah rockets

The main problem for the air force in the war, and in fact for Israel and the IDF, was Hizballah's rocket challenge. On the eve of the war, Hizballah had 14,000 rockets, of which 12,000 were Katyusha 107 mm and 122 mm rockets with a range of up to 20 kilometers, most of them were located not far from Israel, between the border and the Litani river (10,000 rockets). Another 1,000 Katyusha 122 mm had an extended range of 40 kilometers and could reach Haifa. Another 1,000 were Iranian made rockets (610 mm ‘Zelzal’ and 240 mm ‘Fajr’) with a heavy warhead of hundreds of kilograms of explosives located northern to the Litani river and could reach central Israel.

Even before the war, it was clear to the planners that “the effectiveness of aerial hunting of rockets and Katyusha and attacking them with by fire only is expected to be low”. Therefore, the required achievement was defined before the war as the reduction of launches by about 10% to 30% per day, and the destruction of 20% - 50% of the launchers who fired rockets. This perception consciously ignored the possibility that Hizballah would attack Israel daily with small numbers of rocket (100-200 daily) leaving it with many rockets and launchers to conduct an attrition system.

Operation Density reduced the launch capabilities of the medium-range rockets but despite its success, thousands of other rockets remained usable and ready for operation. From the second day of the war, Hizballah began firing rockets and mortar shells at civilians and military targets along the border and deep into Israel. Since the pressure of the air strikes did not prevent Hizballah from firing rockets at Israel and the IDF and the government had no intention of bringing ground forces into Lebanon to solve the problem, the air force had to deal directly with the rocket threat and reduce the fire. The IAF operated in several ways: attacking rocket launchers and ammunition depots, disrupting rocket fire, “hunting rockets”, isolating Lebanon from Syria, and cutting off southern Lebanon to prevent the transfer of rockets to the launching areas.

Throughout the war, the IAF continued its attempts to attack rocket deployments and truck, especially in the long and medium term but the extent of its success depended on intelligence. Five days after the beginning of the war (July 18, 2006), a truck complex carrying ‘Zelzal’ rockets was found, attacked and all the launchers were destroyed. On the other hand, when intelligence was not accurate enough, the attacks did not achieve the desired results. For example, on July 27, 2006, an operation was carried attacking a site suspected of having ‘Zelzal’ rockets, and 40 JDAM bombs were dropped on suspicious targets, apparently without rockets. Despite failures like this, all over the war the long-range rockets didn’t launch, and it appears that it suffered a severe loss.

Disrupting rocket launches

The concept of ‘disrupting rocket launches’ developed in the 1990s and was based on identifying the areas in southern Lebanon from which the rockets were fired, bombing these areas so that the rocket operators would hide and avoid firing, and analyze the results statistically to understand the effectiveness of the bombing. Most of the launching areas bombed that way found in uninhabited areas, particularly in the ‘nature reserves’, brush areas in which Hizballah launching and fighting complexes were built, some of them subterranean. Therefore, even if no targets were identified in this area, such as logistic vehicles, activists or launchers, the bombing of this zone intended to disrupt the rockets launching and reduce their number.

Already in the operations of the 1990s, ‘Accountability’ and ‘Grapes of Wrath’, it was recognized that this method is not efficient enough. However, in the absence of any other effective method, and as the rocket fire continued, from the second day of the war onwards, suspected areas in southern Lebanon bombed according to a daily disruption plan.

In the first two weeks the attacks were made with general-purpose bombs, usually one bomb per disrupt point. To avoid anti-aircraft fire, fighter pilots were instructed not to descend below 12,000 feet while attacking and therefore most of the bombing were made above this height. An attack from this height using general-purpose bombs (simple bombs without guidance ability) led to inaccurate results caused great frustration among the pilots. However, these attacks continued because the disrupting mission, i.e. an attack on areas from which rockets were fired and not on known accuracy targets, hitting 50 meters was good enough.

Since the rocket launches did not stop and the disrupting attacks effectiveness seems low, after two weeks the IAF began to use cluster munition in this mission. To cover wider areas and to mines the routs used by the Hizballah operators who launched the rockets, more than 1,000 CBU bombs were dropped throughout the war. Same time interduce another means of disrupting the launches - an attempt to ignite the brush upon which the rocket launched.

Since the napalm bombs were no longer in use in the late 1980s, IAF used flammable bombs that developed at the beginning of the fighting based on MK 87 training bombs filled with jet fuel on which a front fuse was mounted. Every day, an attempt was made to set the launching areas on fire and in 90% of these attacks the place was lit but mostly the fire went out within minutes and did not affect the rocket launchers. Although different combustion materials and different attack methods were tested, it appears that the success was partial and depends mainly on the area they were trying to ignite.

Of the 6,984 targets attacked during the war, 34% of the attacks (2,376 including assaults by the general-purpose bombs, CBU, incendiary bombs and more) were directed at the disruptive effort, which was ineffective and did not lead to the hoped-for results.

Rocket Hunt

Another effort by the Israeli Air Force was attacking rocket launchers immediately after they were discovered, before or after launching, a method called ‘rocket hunting’. For this purpose, an inter-organization team for fighting the rockets established, led by the Air Force, which promoted many processes in the building of the force, especially systems for detecting launchings and positioning them.

A special task force to fight the rockets established at the Air Force headquarters, that planned the ‘hunt’ mission, and trained the Air Force in the task. Due to partial intelligence about Hizballah's rockets, the IAF decided to concentrate primarily on attacking the mobile launchers found usually on a pickup truck rather than searching for the stationary launchers, which were more difficult to find.

The rocket attacks in the ‘hunting’ mode were based on airborne sensors (usually on UAVs) that flew continuously over the combat zone 24 hours a day, including during the night, and monitored activity in suspicious areas. The UAV operators discovered the launchers sometimes before launch and usually after launching the first rocket. Once the launcher was located, its position was usually automatically transferred to the Air Force's control system, which sent an aircraft that attacked the target with guided munitions. The time elapsed from the launch to the destruction of the launcher was usually several minutes.

Over the course of the war, detection and attack methods were improved, and almost every medium-launched launcher was destroyed within a short time, a total of 36 out of 41 launchings. Seven medium-range launchers were also destroyed before launch (along with the launchers encountered in the opening night, 80 medium-range launchers were destroyed). This was an impressive success, but since Hizballah prepared itself for this option, it had enough medium-range launchers to continue firing these missiles deep into Israel until the last day of the war and without the daily rocket launch rate being reduced.

short-range rockets

However, most of the launches were short-range rockets and 95 percent of those launches were in the relatively close area between the border and the Litani River. Responsibility for handling this threat was in the hands of the Northern Command, but at the beginning of the war, the task of reducing the short-range rocket fire was not even defined in the operational order (that happened only on August 3).

 Gradually, the IAF began attacking short-range rocket launchers in a similar pattern to the medium-range ‘hunt’. Thus, 87 short-range launchers destroyed in this area, and dozens of suspicious elements. Despite this achievement, due to the large number of short-range launchers, the launches continued, inter alia, because this mission was not conducted prior to the war.For example, only in the last week of the war additional intelligence aspects in the launching areas were investigated, including the logistics or the houses of operatives who fired the Katyushas. When these targets were discovered they were attacked to put pressure on the operators of the Katyushas, ​​but “it was too little and too late”.

Another problem that hampered the efficiency of the operation was the division of responsibility between the Northern Command and the Air Force. In general, the Northern Command oversaw the fighting zone up to Litani river and the air force beyond it. On the eve of the war it was determined that the Northern Command had the authority to approve attacks only up to the “yellow line” located about seven kilometers north of the border, and between this line and the Litani river, the air force had the authority to attack. This created an area in which the Northern Command was responsible but did not have the authority to operate aircraft there, whereas the Air Force had the authority to operate planes, but the it had other missions of higher priority than the attack on short-range rockets. In practice, this area was barely attacked, but 69% of short-range rockets were fired from it.

One of the byproducts of these attacks was the targeting of uninvolved civilians. The most significant incident occurred in the village of Qana on July 30 when the jets attacked an area from which the Hizballah fired at Israel, and as a result a building collapsed and 28 civilians were killed. Consequently, Israel stopped the air raids for 48 hours and Hizballah reduced the rocket fire, and on August 1 and 2 only 15 rockets were fired into Israel.

Preventing the transfer of rockets

Another way to reduce the rocket launchings was to isolate Lebanon from Syria to prevent the transfer of weapons from Syria to Lebanon. The Air Force attacked 200 targets on the Syrian-Lebanese border and its leading routes: in northern Lebanon and the Tripoli area, in the Bekaa Valley, and along the mountains south of the Beirut-Damascus road, hitting 50 trucks and vehicles carrying weapons. These attacks were based on intelligence about the vehicles movements, but not all the vehicles carrying rockets were attacked and apparently partial weapons transfers were carried out. However, the air force's activities have significantly reduced the number of arms transfers from Syria to Lebanon.

Similarly, South Lebanon was cut off preventing the transfer of weapons to the launching area. 69 passageways and bridges were blocked on the Litani and Zaharani rivers, 230 points were attacked to block the roads, as well as 300 vehicles violated the closure declared in the area.

The IAF activity reduced arms transfers from the logistical hinterland to southern Lebanon. However, since Hizballah was prepared in advance to reduce the dependence on supplies to the front in southern Lebanon, and the coastal route remained open to humanitarian vehicles and the evacuation of the population, the disengagement did not directly affect the launching of the rocket.

It can be summed up to say that the various attempts by the Air Force to reduce rocket launches failed: Hizballah fired 3,990 rockets into Israel throughout the war, and even increased the number of rockets fired during the last two weeks. 901 rockets hit towns, 46 Israeli civilians were killed and 1,445 were injured.

**Rocket Impacts per Day**



Air Force assistance to Ground Forces

Since the rocket attacks continued, and despite the bombing of the air force a cease-fire was not in sight, the IDF required to use ground forces in Lebanon. Gradually the military frameworks operated in Lebanon grew in correlation with the missions imposed on them.

A week after the war began, infantry battalions raided areas close to the border (the first was a raid on the Hizballah compound near the village of Maroun al-Ras on 19 July). After another week, brigade efforts began to seize a more remote areas (Initially was operation ‘webs of steel 2’, a two brigade capture the town of Bint Jbeil). At the beginning of August, recruitment and training of reserve divisions initiated, and military operations were carried out to takeoff the area in which the security zone was located. During the last week of the war several divisional operations were carried out with the goal of conquering the rocket launching areas south of the Litani River (Operation ‘Change of Direction 11’). But the operation was stopped when the ceasefire went into effect on August 14.

Even before the ground forces entered Lebanon, Israeli Air Force aircraft assisted the Northern Command, mainly in attacks directed by the air force command branch in the Northern Command. Most of the targets attacked in southern Lebanon, were Hizballah soldiers and rocket launchers. With the entrance of ground forces into Lebanon, aerial activity increased supporting the ground maneuvers. Hence it was an attrition war, and the availability of airpower was relatively high, it was applied in characteristics unknown in past wars, or even in the IDF's combat doctrine: the scope of close air support (CAS) and bombing proximity to the ground forces, rescue missions, and supplies from the air.

2,500 sorties of fighter jets attacked in the CAS mission. Approximately 900 attacks were less than 1000 meters from IDF forces and carried out by indirect coordination (without any direct connection between the planes and the ground forces), not according to the combat doctrine, some were 200 meters away only. It should be noted that despite the danger involved in these attacks, no IDF soldier was killed.

Attack helicopters operated in close cooperation with the ground forces and assisted them in mishaps battles of very short ranges. An example was a clash between Battalion 51 of the Golani Brigade and a Hizballah force in the town of Bint Jbeil, within a few dozen meters between the forces. The battle was decided after a few hours, only after attack helicopters fired missiles at Hizballah fighters Hizballah fighters.

The Air Force demonstrated a flexible thought to solve problems in other missions such as rescue of wounded and supplies from the air. Since there were not enough logistic roads in Lebanon, the rescue mission of the wounded was given high priority. Many wounded soldiers evacuated by helicopter from the line of contact, sometimes under fire, and not from rear-gathering stations as defined in combat doctrine. In total, 93% of the seriously injured (62) were evacuated by helicopters alongside hundreds more wounded with lighter injuries.

The lack of logistical roads caused difficulties in supplying equipment to the forces, although they were only a few kilometers away from the border. From 27 July onwards, helicopters supplied the forces in Lebanon every night. With the entry of additional forces into Lebanon, the required equipment increased, and as of July 6.8, supplies began to drop out of Lockheed C-130 Hercules airplanes. The development of this capability during the war, with difficulties and at high risk, allowed the landing of about 360 tons of equipment.

Summary of the aerial warfare - data and lessons

A summary of the quantitative data reveals that the inputs invested by the IAF in the second Lebanon war were very large:

In total, 11,897 sorties of combat aircraft and combat helicopters were carried out, more than the Yom Kippur War. The physical results on the ground were numerous as can be seen in the attached table: thousands of houses had become ruins, Hizballah headquarters were destroyed and hundreds of rockets and launchers attacked.

**Targets attacked from the air**

|  |  |
| --- | --- |
| **Number of targets attacked** | **Type of object attacked** |
| 3,000 | Buildings / bunkers / tunnels |
| 2,400 | Disruption of activity on launching sites |
| 500 | Attacking bridges and blocking roads |
| 700 | Rocket launchers and suspicious vehicles |
| 200 | Armed Hizballah fighters |
| 100 | Communication and radar objectives |
| **6,900** | Total |

These attacks had great significance in the realization of the war's objectives. The main achievement of the war was the deterrent of Hizballah: Since 2006 there has been no further war in Lebanon and Hizballah's terrorist activities on the Lebanese border have stopped. The Lebanese state's responsibility for the south Lebanon region has grown (even if it remains largely limited due to structural problems in Lebanon and Hizballah 's strength in the Shiite area). The bodies of the abducted soldiers were returned to Israel in July 2008, the border between Israel and Lebanon became quiet and the status quo restored.

In the decade after the war, the Air Force has learned some key lessons. Within Organization and Structure Process Force Design:

* Establishment of active aerial defense system (multi-layered) against missiles and rockets as part of the air force: short-range missile interceptor systems (Iron Dome), and medium-range missiles interceptor (David’s sling) were added to the Arrow system for the long-range threats.
* Changing the operational headquarters of the Air Force - Due to the necessity of central control for efficiency and intelligence, and the understanding that the headquarters has become a 'bottleneck' in the management of the campaign, the size of the headquarters tripled, new mission sections were established, cooperation with intelligence branch were strengthened, and there is a distinction between attack missions and the defense missions.
* Increase the offensive capability - which allows IAF to accurately strike thousands of targets in one day. A process requires the production of intelligence for attack targets, supporting logistics and other components.

Additionally, lessons were learned regarding the operation of aerial force and how to fight a possible future war:

* The Campaign Between the Wars - targeted covert inter-war campaign with the purpose of postponing the next confrontation, by preventing Israel's enemies from developing capabilities that will enable them to violate Israel's balance of deterrence and change the regional balance of power, through detecting and selectively destroying emerging threats to Israel's security (as a lesson from the Hizballah buildup until 2006 that did not interfere with the IDF).
* ‘Dahiya doctrine’ - a military strategy which encompasses the destruction of the civilian infrastructure of regimes deemed to be hostile as a measure calculated to deny combatants the use of that infrastructure. Thus, in a future confrontation with Hizballah, the air force will cause massive destruction of the Shiite central quarter, the headquarters of the organization in Beirut, so that the cost of such a war for Hizballah and its supporters may be very high.
* ‘high-intensity attack’ - offensive capabilities of large-scale aerial precisely attacks with a great intensity of thousands of targets a day, which produce a significant cumulative effect. By comparison, in 2006, slightly fewer than 7,000 targets were attacked during the entire war, and in this new concept this number of targets will attacked in few days.

Since these concepts, such as the ‘Dahiya doctrine’ or the ‘high-intensity attack’ were published by the chief of staff and the commander of the air force, it can be assumed that their purpose was to create deterrence before the war and so it might not happen.

Air Force effectiveness in war: Strategy, Operational Design, Tactics

When the members of the Winograd Committee analyzed the operation of the Air Force during the war, they noted: “The Air Force had very impressive achievements in the Second Lebanon War ... It carried out most of its planned missions, and many unplanned missions, successfully and with dedication and high risk... The Israeli Air Force presented exceptional capabilities in the war, there is no doubt about its nature and quality, and it is an important component of Israel's deterrent capability”. Despite this assessment and the fact that the air force was central factor in the war, the committee members claimed that the war “ended without Israel winning militarily”.

**Why, then, is excellence in carrying out the tasks did not lead the way for winning the war?**

Analysis of the effectiveness of air power requires examination at different levels of action: strategic, operational and tactical, since efficiency on one level does not necessarily translate into realization at the other level. Thus, excellent tactical abilities failed to translate into operational or strategic achievements, and on the other hand strategic ideas didn’t executed in the absence of tactical ability. In general, the decisions on the methods of operation at the various levels of war are accepted in the deference levels of war management. Mostly strategic decisions will be made by the government, and the military commanders can only recommend the modus operandi. Decisions at the operational level will be made by the General Staff and the Air Force Command. And Tactical decisions can be made by all military personnel, from the fighters to the army commander.

The implications of the use of air force on the strategic level

First, it is necessary to determine the political objective of the war, and in this case, to thwart the threat and deter Hizballah. From this we can derive the indices for examining the effectiveness of the air force. The political objective must be clear enough and realistic, that is, can be exercised by the military means chosen.

Since the 1990s Israel has chosen to conduct military operations based on fire capabilities, especially aerial, without ground maneuvers and Operation Accountability and Grapes of Wrath in Lebanon were the first. There were various reasons for this, which did not change in 2006, and therefore the government adopted the chief of staff's recommendation during the first two weeks of the 2006 war to refrain from using ground forces. But the air force is not a suitable tool for any mission. As the Air Force commanders noted in the Grapes of Wrath examination as early as 1996:

“We took on a task that we could not carry out … it is like Michael Jordan playing baseball instead of playing basketball … It was the air force Vs. Katyusha rockets and eventually we were unable to win”.

The commanders of the air force, headed by the chief of staff who knew the limits of airpower in action against a low-signature guerilla organization, recommended attacking Lebanon's infrastructure targets, particularly the power stations, in addition to Hizballah 's targets. The chief of staff hoped that pressure from the air force on the Lebanese leadership and fear of a broad strike would create the desired change in Hizballah's activity. However, the politicians' concerns limited Israel and the damage to Lebanon's infrastructure was partial and did not paralyze Lebanon. In the end, the deterioration in the war was since the air force lacked sufficient tools to destroy the rockets and prevent the firing on Israel, while the air strikes failed in creating enough pressure to deter Hizballah.

It is very difficult to achieve a decision in a military clash without conquering territory but by means of aerial fire, and that kind of war becomes a war of attrition that lasts for a relatively long time and causes pressure on the Israeli civilian population. Therefore, Israel was forced to use ground forces, even if it did not want to.

The implications of the use of air force on the Operational Design

The effectiveness of air power depends to a large extent on proper operational design at the system level. Whether to focus on the opponent Vulnerabilities or his centers of gravity as with operation ‘density’, or acting according to a daily assault plan where there is no great significance for priorities, but rather for ‘efficiency’ of operating the planes: management of aircraft traffic, a short stay over targets, and a large number of attacks each day, as was done in most of the 2006 air campaign? There is no ‘right answer’ to this question, and in a war of attrition, the aggregate achievement has significance. However, focused attacks on quality targets (operation ‘density’, Dahiya attack) have operational advantages such as surprise and simultaneity that prevent the opponent from defending and intensifying the physical component of the attack along with the benefits of consciousness, so that these attacks became a symbol in this war.

As Clausewitz has already pointed out, there is a phase in which the intensity of the attack diminishes, and its effectiveness reduces, which he calls, the ‘culminating point of the offensive’. It seems that in the 2006 air campaign there was a similar phenomenon, stemming from the principle of diminishing marginal productivity.

In the first days of the war, the long and medium range rockets were attacked, the Hizballah headquarters in Dahiya collapsed, and Lebanese infrastructures were damaged. Two weeks after the outbreak of the war the chief of staff said that “most of the strategic objectives of the operation were achieved during the first ten days of the operation and now an effort must be made to prevent their erosion through the failure of tactical events that harm Israel's deterrent capability”.

It turns out that the optimum point in the operation of the air force was identified in the Second Lebanon War, but the problem was how to realize the political achievements, that is, force the opponent to agree to a cease-fire and accept the conditions of Israel?

Even though the chief of staff thought that the air force had reach its culminating point on July 27, 2006, the war continued for another three weeks, during which Israel suffered additional losses.It seems that the problem is how to force the other side to reach a cease-fire based solely on air strikes. It may be possible to do so by increasing the intensity of aerial attacks, “to raise the ante”, and to this end it is worthwhile to preserve essential targets for the enemy that can be attacked or threatened to achieve a cease-fire. For this purpose, a hierarchy of targets must be created and to prepare a rolling escalating campaign.

This is a very difficult task. The Israeli Air Force failed to do so in 2006, and only when the ground forces entered Lebanon and the pressure on Hizballah increased did Israel succeed in achieving a cease-fire under the favorite conditions.

The entry of the ground forces into the war necessitated a more complex management of the operation so that the air effort and ground effort would be synchronized.

In practice, the IDF conducted two different and almost unrelated wars: the aerial war the air force, and the ground war. Although the Air Force has an extension of its operational headquarters in the Northern Command, they weren’t synchronized enough. An extreme expression of this was the limited treatment of the short-range rockets in the seam between the lines of responsibility, an array that continued to be launched throughout the war. An extreme expression of this was the limited treatment of short-range rockets found between the lines of responsibility.

The military commanders' fear that tactical events could harm the achievements of the campaign was primarily intended to unintentionally harm of civilians. One of Israel’s problems involved in the confrontation in a civilian environment in which Hizballah is located is the achievement of international legitimacy for the use of airpower, and hence the sensitivity to harming the uninvolved. In two incidents in the village of Kana, in Operation ‘Grapes of Wrath’ in 1996 and in the Second Lebanon War in 2006, many civilians were killed in an artillery or air strike. As a result, in both cases world public opinion, which until then supported Israel, changed and international pressure began to end the operation, not necessarily in accordance with Israel's conditions.

The operational design of the campaign is influenced also by the media arena, which reports on the events in real time and shapes the public opinion. The media has several goals: communication with the Israeli public, to win its trust, especially in a long campaign in which the public is hurt and is required to pay the price. The international media in which Hezbollah attacks aimed at harming Israeli civilians were presented and defined as acts of terrorism operating in violation of international law. And communication with Lebanese citizens in an attempt to create a narrative that serves the purpose of the war - creating a new deterrence, or to warn them to stay away from their homes so as not to harm them (During the war, Israeli Air Force planes blocked Hizballah's media channels and placed 17,300,000 leaflets in Lebanon warning residents of southern Lebanon to leave their homes in order to avoid being hit).

The implications of the use of air force on the Tactical level

Because of the nature of aerial warfare, and the fact that unlike ground forces the aircraft are not on the ground, intelligence about the targets is essential for effective operation of the air force. This issue becomes more acute with the use of precise GPS-guided weapons and in the fighting against irregular organizations whose ‘disappearance’ is one of their distinguishing features. There is a full correlation between effective attacks and accurate intelligence, and vice versa, in the absence of intelligence aerial actions inefficient. Hence the vital need for in-depth intelligence research on the opponent who produces targets for attack and keeps them up-to-date.

An example of the ineffectiveness air attack in the absence of intelligence was the raids to disrupt the rocket fire. Despite the considerable effort invested in these missions, the rocket fire did not stop and was not suppressed. So, an inaccurate fire requires a very large scope to be significant. During the Second World War, Allied forces operated in Godwood and Cobra Operations when thousands of tons of armaments were dropped in a short time over a limited number of kilometers, but the disruption attacks in 2006 were relatively low intense and therefore ineffective. Therefore, in a period when the area bombing is not relevant, for reasons of international legitimacy and resource, these bombs are an example of incorrect tactical use of air force.

On the other hand, the Air Force demonstrated impressive capabilities in developing quick solutions to unforeseen problems and adapting to the battlefield in an efficient manner. This culture of flexible thinking and a willingness to internalize rapid changes has led to many tactical successes.

Since there will always be unexpected challenges on the battlefield that the enemy has created, the ability to adapt quickly to adaptations and adaptations of combat doctrine is of great tactical importance and it is important to preserve this. Since there will always be unanticipated challenges on the battlefield that the enemy has created, rapid adaptability to change is of great tactical importance and it is important to preserve it.

1. The commission of inquiry into the events of military engagement in Lebanon 2006 (Winograd Committee), Final Report, Vol. 1, January 2008, pp. 33-34. My Emphases, NH [↑](#footnote-ref-1)
2. The Air Force Command- the History of the Air Force, An Investigation of Operation Grapes of Wrath, Israel Shafir, 16.9.1996, p. 304. [↑](#footnote-ref-2)
3. Ibid, Danny Halutz, 16.9.1996, p. 310. [↑](#footnote-ref-3)
4. Ibid, , p. 306, 314. [↑](#footnote-ref-4)
5. Hassan Nasrallah's victory speech in Bint Jbeil, May 26, 2000. Goldberg, Jeffrey, “In the Party of God”, *The New Yorker*, 14 October 2002. [↑](#footnote-ref-5)
6. Between the withdrawal from Lebanon in 2000 and the outbreak of the war on July 12, 2006, there were a total of 176 Hizballah attacks originating from Lebanese territory (either by land or by rockets), of which 25 Israeli soldiers and six civilians were killed, and 104 soldiers and civilians Israelis. [↑](#footnote-ref-6)
7. Winograd Committee, Interim Report, pp. 68-70. [↑](#footnote-ref-7)
8. the 110th Squadron's investigation into the Second Lebanon War [↑](#footnote-ref-8)