CHAPTER THREE

AIR POWER IN OCTOBER 1973 WAR

The General who is skilled in defence hides in the most secret recesses of the earth; he who is skilled in attack flashes forth from the topmost heights of heaven.

- Sun Tzu, The art of War

Section I: Planning and Conduct of the War

Introduction

The October 1973 War is known as the Fourth Arab-Israeli War. It is also called the Yom Kippur War by the Israelis and Ramadan War by the Arabs. It was the direct consequence of the Six-Day War of June 1967 in which Israeli forces had occupied vast areas of Arab territory in the Sinai, the Golan Heights, the West Bank, and east Jerusalem. Despite the acceptance by Israel of the UN Security Council Resolution 242 which had called for vacation of Arab territory occupied by Israel during the June 1967 War, Israel had shown no signs of giving up this territory as it considered the depth provided by the new frontiers of advantage to security against Arab aggression. Egypt had started the "War of Attrition" (1968-1970) to prevent Israel from consolidating its fortifications on the east bank of the Suez
Canal. After a comparative lull in fighting during 1971-1972, when President Sadat of Egypt had announced his "Year of Decision", Egypt and Syria had formulated a highly secret two-front war plan of simultaneous attack to recover their lost territories in the Sinai and the Golan Heights.¹

Planning for a Combined Two-Front Operation

The surprise and initial success achieved by the Arab side in the October 1973 War was a result of long-term advance planning by the Egyptian and Syrian political and military leadership. As early as in July 1972 President Sadat asked all the Soviet military advisors in Egypt numbering some 15,000 to leave Egypt. The reason for the expulsion of Soviet experts was given as Soviet's unhelpful attitude to arms supplies to Egypt and the overbearing attitude of Soviet experts towards their Egyptian colleagues. The expulsion of the Soviet specialists was a strong indicator to Israel and the rest of the world that there would be no war in the near future.²

In a meeting in April 1973 Egyptian President Sadat and Syrian President Hafez al-Assad jointly decided to start

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² ibid, p. 232.
hostilities against Israel in October 1973. They also decided that Supreme Joint Council was to work out joint plans and co-ordinate all actions. A meeting of the Supreme Joint Council was held in Alexandria in August 1973 to give the plans a final form. The war aim of Egypt was limited to the capture of territory on the east bank of the Suez Canal. The Egyptian forces were to establish a strong foothold on the east bank and consolidate their position to prevent any Israeli attempt to recapture it. The crossing of a large and deep water barrier like the Suez Canal was considered a very difficult military operation and the success in such an operation would restore self-confidence and morale of Egyptian forces.³

According to Abba Eban, the Israeli Ambassador in the United States at that time, "the decision to shake the frozen deadlock by a military action was almost certainly an independent decision of President Sadat, supplemented later by synchronisation with Syria".⁴ The plans prepared by the Supreme Joint Council were based on certain presumptions regarding the advantages and disadvantages in the Israeli strategic situation. As assessed by the Egyptian War Minister General Ismail, the

³ ibid, p. 244.
Israelis had four main advantages: air superiority; technological skill; thorough and efficient training; and reliance on quick aid from the United States. The disadvantages were: long lines of communications difficult to defend; limited manpower resources and inability to sustain heavy losses; economic resources insufficient for a long war; and wanton conceit.\(^5\)

The advantages on the Egyptian side were: numerical superiority in manpower and equipment; a penchant for set-piece cohesive battle; and near absolute defence cover over the canal provided by interlocking SAM systems. On the other hand, the Egyptians suffered the following disadvantages: qualitative inferiority in tanks and aircraft; a case history of low morale due to a series of crushing defeats; and no tradition of fast moving mobile battles. After examining the various factore affecting the forces on both sides, the Egyptian high command which comprised War Minister and Commander-in-Chief, General Ahmed Ismael, and Chief of Staff General Saad-el-Shazli, decided that the military objective of the Egyptian forces would be a limited offensive to establish a bridgehead across the Canal, i.e., to mount an offensive of just sufficient proportions to spark an international crisis and then persuade the superpowers

that the West Asia situation was too dangerous to remain unresolved indefinitely.\textsuperscript{6}

According to General Palit, a well known Indian military analyst, "Overall plan of operation was to be based strategically, on a broad front offensive stretching along the whole length of the Suez Canal but limited in depth to the air cover provided by the SAMs; and tactically, the plan was to be based mainly on infantry operations, with armour acting in support. This latter was a major reversal of contemporary tactical trends and in the event it paid dividends." The Egyptian plan for crossing the Canal was made to cater for not only the crossing of a water obstacle but also to ensure successful landing on an enemy held shore.\textsuperscript{7}

The limited aim of Egyptian military operations is also confirmed by Generals Badri, Magdoub, and Zohdy, three senior officers who held important staff positions in the Egyptian high command during the war. According to them the military objective was to establish a bridgehead across the Suez Canal. The plan also provided for deception measures to hide real intentions of

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\item \textsuperscript{6} D.K. Palit, (Maj Gen) \textit{Return to Sinai}, (Dehradun, 1974), pp. 40-41.
\item \textsuperscript{7} ibid.
\end{itemize}
launching an offensive and to conceal its timing, the direction of the main thrust, and the size of participating forces. This was to be done by making the enemy believe that the Egyptian forces were merely perfecting defensive preparations and raising their fighting capability through normal training exercises.8

The measures taken to achieve deception were: defensive preparations against Israeli surprise attack; large troop movements from front to rear and from rear areas to the front near the Canal as an indicator of training exercises; over the previous six months frequent concentration of troops indicating intentions to attack along with large scale movements for exercises; and practice of mobilisation of reserves and demobilisation at regular intervals. Just 48 hours before launching the offensive on the Canal, 20,000 troops demobilised, ensuring that this was made known to the Israeli intelligence.

In addition to measures for tactical surprise mentioned above, strategic surprise was achieved by timing the offensive during "Yom Kippur" and "Ramadan" which were holiday periods and so least expected to be used for mounting an attack. The exact

timing for the attack was planned for the afternoon so that after adequate time for the Egyptian Air Force to mount two missions by each aircraft, the Israeli Air force would not be able to retaliate due to night fall. It would, therefore, be evident that the plan fully catered for tactical and strategic surprise and was drawn up jointly by Ministries of Defence, Foreign Affairs, and Information, and co-ordinated with the other major partner in the plan, Syria. Henry Kissinger, in his memoirs, called the Egyptian and Syrian attack on Israel on October 6, a total surprise, strategic and tactical. The United States and Israel were both surprised.

The Egyptian plan was made to take care of the Israeli security strategy as assessed by the Egyptian planning staff. The first strong point of Israeli strategy was secure borders like the Suez Canal, a daunting natural obstacle almost impossible to cross in force and defended by massive fortifications of the Bar-Lev Line. Another major doctrine was a pre-emptive air strike by Israeli long-range air force planes. But such a pre-emptive air strike needed real time and accurate intelligence about enemy intentions and plans. For this purpose

9 ibid, p. 49.
Israel had created one of the best intelligence services in the world which had links with the United States' Central Intelligence Agency (CIA). The last line of defence were the Israeli armoured forces which were to take care of any incursions into Israeli territory.

To nullify these Israeli assets, the Egyptian plan called for total strategic and tactical surprise. Secondly, in order to delay Israeli reaction to Egyptian offensive, air attacks were planned on all Israeli communication centers in the Sinai. And lastly, but of most importance, the Israeli Air Force was to be countered by a missile and gun barrage from the latest SAM systems of Soviet origin.\textsuperscript{11}

According to the Insight Team of the \textit{Sunday Times} of London, "the single most powerful factor towards surprise was the plan to attack on two fronts; Israel never suspected that the Arabs were capable of doing this."\textsuperscript{12} Henry Kissinger attributes the Israeli and American intelligence failure on faulty analysis and assessment at the political level, in a situation when too much


\textsuperscript{12} ibid.
of intelligence information was available from the Israeli intelligence agency Mossad and the CIA.\textsuperscript{13}

The total surprise planned and achieved by the Arabs in their offensive against Israel was, according to a British diplomat, "a classic case of intelligence understanding the capability of an enemy but not his intentions." The basic problem lay with Israeli military intelligence which was of the view that the Egyptians could be defeated as easily as in 1967, despite the recently acquired sophisticated Soviet weapons.\textsuperscript{14}

Another well-known military analyst of the Middle-East wars, who has written several books on the conflicts in the region, says that, "the basic plan called for the Egyptians to cross the Canal in strength, overcome the Bar-Lev Line - a string of Israeli forts defending the east bank-, advance eastward, and then dig in to wait for and repulse the Israeli counterattack before making a further advance-although it was hoped that at this stage superpowers or the United Nations would intervene to enforce a cease-fire. This plan was strongly influenced by the fact that the Egyptian Air Force was not yet equal to that of

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\item[14] Sunday Times, n. 11, p. 64.
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The Egyptian planners felt that the dense deployment of anti-aircraft weapons like SA-3 and SA-6 and ZSU-23-4 AA guns protecting the canal would effectively prevent enemy aircraft from interfering with the crossing and consolidation on the east bank.

It is, therefore, clear that the major factor for the limited objective in the Egyptian plan was the inability of its air force to provide air support while being threatened by the Israeli Air Force beyond the missile cover which extended to only 10 miles east of the Canal.

The Arab military offensive plans were in two phases. During phase one, Egypt was to cross the Canal, storm the Bar-Lev Line, and advance to three passes which were about 35 miles from the Canal. Meanwhile, Syria was to capture the entire region of Golan Heights and gain a foothold on the West Bank, and Jordan was to pose a threat on the eastern front. In the second phase, Israel would be pressed to evacuate the occupied territories. If it refused, the Arabs would continue fighting.¹⁶

¹⁶ ibid, p. 40.
The Israeli military strategy has been described as offensive in nature, which implied that Israel had to take the battle in the enemy's territory. The entire structure of the Israeli Army was designed to achieve this aim. Its equipment and tactics also were suited to an offensive strategy. As the major part of the Israeli Army comprised the reserves, these had to be mobilised within 48 hours. This strategy also needed an efficient system of logistics and communications to carry the reserves to the battlefront within the shortest possible time. All this had to be done in an environment free from enemy's air interference. This called for an air defence system on constant alert, and the need for maintaining an air force strong in air defence and offensive capabilities and superior to the combined strength of all the neighbouring Arab countries. The Israeli Air Force had to be strong enough to react quickly on many fronts simultaneously.17

On the other hand, the main consideration which guided Egyptian strategy were the lessons of 1967 War. During that war Egypt suffered from a lack of national strategy combining the political and military objectives, and the armed forces were totally surprised. For planning the 1973 War, national

objectives were clearly defined; and Israeli air threat was to be countered by a dense air defence umbrella provided by SAMs over the Canal.  

Chaim Herzog, an Israeli soldier-statesman and later President of Israel, also emphasised that the main factor in limiting the objectives of the Egyptian offensive operation of crossing the Canal was the Israeli Air Force. The Israeli air offensive capability compelled the Egyptians to devote a major portion of their effort in the construction of surface-to-air missile sites which could provide effective umbrella to their ground forces while crossing the Canal and during the critical phase of consolidation on the east bank. It was the Israeli Air Force which was again responsible for limiting the Egyptian advance and this was possible without the Israeli Air Force flying a single mission in the region. That the Egyptians had been correct in remaining within the missile covered zone became evident when the Israeli Air Force twice attacked their advancing forces and destroyed them while they were pushing southwards along the Gulf of Suez.


On this point, Edgar O'Ballance agrees with the Israeli claim that the limitations of their air force restricted the Arabs to limit their objectives. It was not possible for their ground forces to successfully move forward outside the cover of their air defence umbrella of SAMs and anti-aircraft guns without suffering heavy losses from Israeli air attacks.\textsuperscript{20}

\textbf{The Conduct of the War}

The fourth Middle East War which broke out on October 6, 1973 can be divided in four distinct phases for the purpose of this study:\textsuperscript{21}

1. Phase One: Egyptian and Syrian joint offensive against Israel and Israeli withdrawal. 6-9 October.

\textbf{Phase One: Arab Offensive}

On October 6, 1973 Egypt and Syria, launched a surprise

\textsuperscript{20} O'Ballance, n. 15, p. 303.

attack on Israel at about 1400 hours. This was the `Yom Kippur' religious holiday in Israel when all private and government offices were closed. The attack was carried out by ground forces supported by the Egyptian and Syrian air forces. On the Suez front the Egyptian forces had crossed the Canal on October 6 at five points and ferried across about 400 tanks within the first 24 hours. Thereafter, they captured the Israeli fortifications on the east bank of the Canal known as the Bar-Lev Line throughout the 100-mile long Canal. On October 7, strong contingents of infantry and armour crossed over to the east bank using Soviet-built pontoon bridges of which there were about a dozen across the canal. The Egyptians, fighting bravely, met stiff resistance from the Israeli forces holding the defences at the Bar-Lev Line. The Israeli Air Force flew a large number of missions to attack and destroy Egyptian missile sites and pontoon bridges. However, it suffered serious losses due to SAM systems deployed by the Egyptians along the Canal. According to Egyptian claims they shot down 43 Israeli aircraft and themselves lost 16 during the first 24 hours. By October 8 Egypt had occupied the whole length of the Suez Canal on the east bank and its forces were in the process of consolidating their postion.22 (see map on next page.)

The Egyptian Assault—Across the Canal 6 October 1973

During the first phase on the Syrian front, the Syrian Army launched an armoured attack with about 1,400 tanks with the aim to recapture the Golan Heights lost to the Israelis during the 1967 Arab-Israeli War. The Syrian forces made a rapid advance during the next three days and recovered almost the whole of Golan Heights and reached within a few miles of Israel proper. During this period, there were several big air battles between the Israeli and the Syrian Air Forces, while on the ground, Israel was fighting mainly a defensive battle. After a Syrian attack by Soviet Frog-7 surface-to-surface rockets on Israeli settlements on the Golan Heights, the Israeli Phantom aircraft attacked Ministry of Defence headquarters and the Syrian radio station in Damascus. Israeli aircraft also mounted attacks on the Damascus airport and the town of Homs in central Syria, and a radar station in Lebanon, which was being used by Syria for monitoring Israeli air activity.\(^2\)\(^3\)

Writing about the fighting on the Golan front during the first phase, Edgar O'Ballance highlights the strategic importance of the region which overlooked the Jordan Valley and provided a direct route between Damascus and Palestine. The fighting on this front started by a massive Syrian air strike

\(^2\) ibid, p. 26175.
by about 100 aircraft on military targets on Golan Heights. This was accompanied by Syrian armour in large numbers advancing against Israeli forces which were retreating. In this critical situation, the Israelis depended mainly on their air force which provided close support and interdiction, and in which it suffered heavy losses from Syrian SAMs and anti-aircraft guns which were part of the advancing Syrian Army. On the very first afternoon it lost about 30 aircraft.\(^24\) (See map on next page.)

On the Golan front, there were no more than 200 Israeli tanks when the Syrians mounted their offensive on October 6 with about 1,200 tanks and almost 300 aircraft. While Israeli ground forces tried to hold up Syrian advance during the day-light hours, they could not cope up with the attacking armour fitted with night-fighting devices. The Syrian advance was rapid and by the morning of October 7, they were just nine miles from the Sea of Galilee. Now the entire air effort of the Israeli Air Force was diverted from the Suez sector to the Syrian front. Defence Minister Moshe Dayan told the Air Force Commander Benny Peled to leave Sinai alone, which was of no importance just then, and take care of the Golan front. The switch from the Sinai to the Golan front demonstrated the great flexibility of air power and

\(^{24}\) O'Ballance, n. 15, p. 125.
The Golan Heights - Opening Syrian Attack 6 October 1973

its mobility on the battlefield. The Israeli Air Force was tasked to destroy Syrian armour and delay the Syrian advance while reinforcements were being sent to the Golan front after recall of reservists. The reason for heavy losses suffered by the Israeli Air Force was the dense level of anti-aircraft guns—about 400—and more than 100 batteries of SA-2, SA-3, and SA-6 surface to air missiles with 400 to 500 launchers. 25

Phase Two: Israeli Counter attack Against Syria

During the second phase of the conflict, on October 10, the Iraqi armoured force of some 18,000 men and 200 aircraft had joined the Syrian forces and had gone into action against Israeli positions. The situation on the front, however, had stabilised with the arrival of Israeli reinforcements, and Israeli forces had mounted a counter offensive which had forced the Syrian army to retreat. According to press reports about 800 tanks of Syria had been destroyed during the first 4-5 days of the war on the Golan front. During the same period, the Israeli Air Force attacked the biggest oil refinery at Homs and set it on fire and also carried out attacks against the main port of Tartus and Latakia, which received Soviet military supplies for Syria.

The strategic air offensive inside Syria by the Israeli Air Force was of limited dimension as compared to its main role of close air support and interdiction of the battlefield to help the ground forces to turn the tide of battle against Syria. The Israeli aircraft evolved the tactics of flying very low while approaching the target, then pulling up sharply followed by a single-pass attack and a quick get-away. This method of attacking the targets helped to reduce losses from low-level SAMs and anti-aircraft guns deployed by Syria and integrated with the ground forces.26

Israeli counter-attack on the Golan front had forced the Syrian army to withdraw behind the 1967 cease-fire line by October 12 and the Israeli armour along with Israeli troops had entered Syrian territory to a depth of six miles. Ground war and air battles continued with great intensity on the Syrian front. On October 13 Jordan and Saudi Arabia announced their decision to join the war on the side of Syria and their units were deployed on the Syrian front.

The primary role of the Israeli Air Force on the Golan front

in the initial phase was to provide air support to ground operations. On the crucial day of October 7, the Israeli Air Force flew hundreds of sorties on ground attack missions and inflicted heavy losses on Arab mechanised units when they were outside the SAM defended air defence umbrella. The Israeli Air Force can surely be credited with success in halting the Syrian advance just a few miles short of their objective. 27

In the opening stages of the war on the Golan front, the Israeli Air Force was the only military means of opposing the Syrian advance till the reserves arrived and organised a counter-attack. In the face of very dense missile and anti-aircraft gunfire, the Israeli aircraft began attacking the SAM sites as first priority targets. During an intense battle lasting over four days, the Israeli Air Force knocked out more than fifty per cent of the SAMs on the Syrian front. 28

Another factor which caused the collapse of Syrian armoured offensive on the Golan front was the attack by the Israeli aircraft on road tankers bringing fuel for the Syrian tanks. Since a large number of these were destroyed by the Israeli Air

28 Frank Aker, n. 5, p. 50.
Force, the Syrian armoured formations ran out of fuel and advancing Israeli forces found a large number of undamaged tanks abandoned by the Syrian crew because they had no petrol.\textsuperscript{29}

According to an Israeli defence commentator, "it was the turning point of the Golan battle brought about by the supreme effort of our Air Force". However, this effort in the face of dense and integrated deployment of SAM systems and anti-aircraft guns resulted in very heavy casualties for Israeli aircraft. The loss rate during this battle was 8 aircraft per 100 sorties as compared to only 4 aircraft during 1967 Arab-Israeli War.\textsuperscript{30}

The integrated missile system which shot down most of the Israeli aircraft over the Golan was effective from ground level up to 70,000 feet. For low level target interception and destruction, there were SAM-6, Sam-7 and ZSU-23-4 anti-aircraft guns; all these were highly mobile. For medium level, there were SAM-3 missiles which were semi-mobile and for high level interception SAM-2 systems were deployed around static targets like cities and airfields. During the first week the Israeli Air Force lost 78 aircraft, about two-thirds of them over Golan, all

\textsuperscript{29} \textit{Sunday Times}, n. 11, p. 182.
\textsuperscript{30} ibid, p. 184.
shot down by the mobile low level systems like the SAM-6s and ZSU-23-4 AA guns. Official Israeli figures indicated only 5 aircraft lost in air combat out of a total of 115 aircraft lost by Israel during the war.\textsuperscript{31}

Phase Three: Egyptian Offensive October 14

A plan for an offensive by armoured mechanised units was prepared by the Egyptian General Staff on October 11. The objectives of the Egyptian offensive were the western entrances to the passes in the Sinai. It was appreciated that the main threat to the advancing forces would be the Israeli Air Force because the SAM and AA gun defences could not provide cover to the troops far away from the Canal.\textsuperscript{32}

Advancing Egyptian forces would not have the air defence cover of missile and gun umbrella which was available to them when operating close to the Canal. The Egyptian offensive began with an air strike against Israeli command and control centers in the Sinai; other important military targets were also attacked by the Egyptian Air Force. The Israeli forces put up stiff resistance and used the newly acquired TOW anti-tank

\textsuperscript{31} ibid, p. 185.  
\textsuperscript{32} Badri, Magdoub and Zohdy, n. 8, p. 97.
missiles against advancing Egyptian armour which caused heavy losses. In addition, the Israeli Air Force mounted a large scale determined close support operation against the Egyptian offensive. According to Egyptian sources, despite heavy odds, units of the Egyptian forces penetrated 15-16 km east of the Canal positions.

At this stage of the tank battle, Israel asked its Air Force to reduce effort on the Golan front and put maximum air effort to help the Israeli forces in stopping the advance of Egyptian armour in the Sinai. By end of the day-October 14-it was clear that the main Israeli effort had now shifted from Golan to the Sinai front, thus releasing the pressure on Syrian forces. The Egyptian high command felt that the purpose of the offensive in the Sinai had been served and so decided to withdraw to the original bridgehead.\textsuperscript{33}

According to Generals Badri, Magdoub and Zohdy, October 14 was also a day of air battles. The Egyptian Air Force, in addition to providing close air support to the advancing armoured and mechanised forces in the Sinai, was fighting independent air battles over the Delta with the Israeli Air Force, which had mounted concentrated air attacks against airports and air bases

\textsuperscript{33} ibid, p. 98.
twice on the same day at 0900 and 1520 hrs. Egyptian Air Force is said to have fought its most successful battle on that day when it shot down 15 Phantoms with a loss of only 9 MiG-21.  

General Chaim Herzog, former chief of Israeli Intelligence, describes the tank battle of October 14, the largest tank battle in history—apart from the battle of Kursk in the Soviet Union during the Second World War—with some 2000 tanks locked in battle. According to him, the Israeli Air Force attacked and destroyed 60 Egyptian tanks and armoured personnel carriers (APCs). He claims that Israeli forces destroyed 264 Egyptian tanks while Israeli losses were only six tanks.  

General DK Palit confirms the generally held belief that the Egyptian plan for offensive into Sinai on October 14 was a result of Syrian pressure on Egypt to relieve Israeli pressure on the Golan Heights.  

On October 14, Egyptian armoured columns moved out in assault formation towards Israeli defences with a tank strength

34 ibid.
35 Chaim Herzog, n.19, p. 200.
36 Palit, n.6, p.120.
of about 600-800. Meanwhile Egyptian Air Force attacked Israeli tank concentration areas. But during the assault, Egyptians suffered heavy casualties both from air straffing and from guns and missiles of Israeli armoured forces. Now the Israelis were 'chopping up' the Egyptian armour. Israelis claim to have destroyed 200 tanks; Israeli Maj General Mendlar was killed on October 14. Israelis now redeployed forces from Golan to Suez front; three mechanised and one armoured brigades were transferred from Golan to Sinai on 14-15 October.37 According to General Palit, the Egyptian offensive on October 14, to relieve pressure on the Syrian front—the biggest armour battle since the Second World War—did not succeed.

General Ahmed Ismael, War Minister and Commander-in-Chief of Egyptian forces, during an interview with Mohammad Heikal editor of Al-Ahram Cairo, described his operational strategy as follows:

'Ve had begun the operation under the protection of our famous missile network. If I had to advance beyond that I would have to wait—until I made sure that my forces had adequate protection. Our air force had performed heroic feats but if I

37 ibid.
had thrown in my army in the footsteps of an available opportunity without any air defence cover against enemy's air superiority, it would have meant that I was throwing the entire burden on the air force and assigning to it tasks which were more than it could stand. Therefore, I abided by our plan, which envisaged a build-up pause after completing the crossing operation - a pause during which I could re-evaluate the situation in the light of enemy's reaction. Yet, we had to launch a wide front offensive before the suitable moment. Our object in doing so was to relieve pressure on Syria, and when I felt that we had succeeded in forcing the enemy to withdraw some of his forces from the Syrian front, I prepared going back to the bridgeheads to proceed with their consolidation."

Palit, commenting on General Ismael's strategy says, "'Certainly Ismael was cautious - but he had every reason to be. The Egyptian Air Force was used in the ground support role whenever it was required. But Ismael knew that it could not take on the Mirages and Phantoms of the Israeli Air Force in aerial combat without grave risk of large scale losses.'"

Therefore, further Egyptian advance into Sinai could be

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ibid, p. 122-123.
made only if the Egyptian Air Force could secure air superiority over the tactical area. This was possible if the Israeli Air Force had lost enough aircraft to become ineffective. However, Israel, despite heavy aircraft losses was able to maintain its superiority because of American re-supply of latest versions of F-4 Phantoms and A-4 Skyhawks aircraft fitted with EW systems. The caution on the part of General Ismael was, therefore, justified. 39

In a more recent case study conducted by the Office of the Air Force History of the United States Air Force, the Syrian appeal for help to reduce the pressure on the Golan front has been confirmed as the cause of the change in the plans of the Egyptian high command from a strategy of consolidation of the Canal bridgehead to a strategy of offensive action in the Sinai. The Egyptian military leadership did not think it a good idea to expose their troops to the Israeli Air Force even though fourteen missile batteries—including six of SAM-6 systems—were set up east of the Canal. "The enemy air force can still cripple our ground forces as soon as they poke their noses beyond our SAM umbrella," argued their Chief of Staff Saad el-Shazli. 40

39 ibid.
40 Cooling, n. 25, p. 519.
"We don't have enough SAM-6s to give mobile protection to our forces in the open. Advance and we destroy our troops without offering any significant relief to our brothers the Syrians."

The political leadership in Cairo, however, overruled him. The Egyptian offensive which was then launched without adequate and integrated air defence missile and AA gun cover was heavily pounded by the Israeli Air Force in the largest tank battle since Kursk in 1943, "October 14 was the war's first black day for the Egyptian Army," commented General El Shazli. "It is estimated to have lost between 200 and 250 tanks in armoured battles and another few dozen to the Israeli Air Force."

General Avraham Adan, who commanded an armoured division on the Egyptian front and fought with his division during the Egyptian tank offensive on October 14 describes the tank assault which was preceded by early morning attack by the Egyptian aircraft. The Israeli tank crews fought bravely and suffered many casualties. The second wave of the Egyptian attack came later in the morning. After some bitter fighting, the Egyptian assault was broken by about mid-day. The Egyptian offensive was finally repulsed and Israeli forces destroyed about 200 Egyptian tanks at a loss of 25 of their own.41

Phase Four: Israeli Crossing of the Canal

This last phase of the war lasted from October 15 to October 22. On October 12, the task for crossing the Suez Canal from the east bank to the west bank was given to General Sharon, who was to undertake it with a brigade of paratroopers assisted by armour. The specific task was to establish a bridgehead about three miles wide and destroy SAM systems on the west bank to create a gap in the Egyptian missile umbrella to enable Israeli aircraft to operate over the west bank and achieve air superiority. In the event, the para brigade of General Sharon crossed over from the east bank to the west bank on the evening of October 15, while the first wave of Israeli troops after crossing the Canal established a bridgehead on the west bank on the morning of October 16. The next day Egyptian aircraft carried out heavy interdiction and bombing missions on the Israeli bridgehead. These were intercepted by Israeli aircraft giving cover to Israeli troops and in the ensuing air battles a number of Egyptian aircraft were shot down. 42 ·· The raids on SAM sites on the west bank by Israeli troops and their destruction was producing good results for the Israeli Air Force, which could now provide full support to ground troops. 43

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42 Herzog, n. 19, pp. 208, 229.
43 ibid, p. 242.
Sunday Times Insight Team also confirmed that the Israeli offensive across the Canal began at 5 PM on October 15 and by 9 AM on October 16 about 30 tanks and 2,000 Israeli troops had crossed the Canal. During the battle for the command of the air over the west bank, Israeli Mirages shot down several MIGs over the Israeli bridgehead. In this area the missile sites had been destroyed by the Israeli troops creating a gap about 15 miles wide in the missile umbrella. "Israeli pilots seized brilliantly the chances offered by the air space Sharon's raiding parties had cleared. A standard technique swiftly developed. The Israeli ground attack aircraft would approach very low over Sinai, swoop up to gain height in the cone of air space now cleared of SAMs, then dive down to put down a curtain of rocket and cannon fire for the Israeli forces around the perimeter of the bridgehead and the corridor to it. For the first time, Israeli tank commanders could call down air strikes to clear positions ahead of them. And as the Egyptians on the west bank once more faced the classic Israeli combination of armour and air strikes, they were once again unable to cope. Slowly, the Egyptians retreated and the Israelis expanded the bridgehead." 44

As a result of this setback, General Maamoun of the Second

44  
Sunday Times, n. 11, p. 343.
Army suffered a heart attack and the Egyptian Chief of Staff General Shazli was dismissed.45

After securing the bridgehead on the west bank of the Canal, Israeli forces led by armour advanced south in the direction of Suez city and cut off the road leading from Cairo to Suez, thus blocking all supplies to the Third Egyptian Army deployed east of the Canal.46 (See map on the next page.)

While analysing the Israeli operations of crossing the Canal and establishing the bridgehead on the west bank, General Herzog made the following comments in Tel Aviv on October 21:

"The Israeli forces had taken a gamble when they put a task force on the west bank of the Suez Canal. The task force, which countered a minimum of opposition on the other side, entered the battle in a co-ordinated manner, moving against the missile sites. As it widened the arc of its penetration, it overran more missile sites and rendered the area over the main field of battle on the Canal's east bank less dangerous. Gradually, the wedge widened to a corridor in very fierce fighting, and this enabled armour and artillery to join the task force." 45

45 ibid, pp. 344, 345.
46 ibid, p. 346.
The Israeli Counter-Attack and Position at the Cease-Fire

The area on the west bank of the Canal was gradually widened by the Israeli task force and more missile batteries were destroyed, thus making the air corridor for Israeli aircraft wider. Here we find that it was the ground task force which initially provided support to the air force by neutralising missile batteries, thus enabling the air force to give support to the ground forces. 4 7

From the Egyptian side, Generals Badri, Magdoub and Zohdy confirm that on the morning of October 15 Israeli forces infiltrated the west bank of the Canal. Their primary objective appeared to be the anti-aircraft missile positions, which were attacked by tank guns and artillery fire and some of them were destroyed. Their destruction caused a gap in the air defence missile umbrella which enabled the Israeli aircraft to attack the Egyptian positions. To counter the Israeli penetration, a complete brigade was tasked to mount a counter-attack. However, this counter-attack failed because of concentrated Israeli Air Force support to the enemy and attack on Egyptian forces. The Second and Third Army elements which were only four kilometers apart failed to link up due to strong Israeli resistance. In the next few days 2-3 Israeli brigades had crossed over to the west

47 Keesing's, n. 22, p. 261-74.
bank. 'Enemy air forces concentrated their effort on the air defence system. They succeeded in protecting scattered forces stationed there amid the trees and bushes, helping to avoid engaging in serious fighting with the Egyptian forces.'

During this stage of the campaign, the Egyptian Air Force flew 1,050 sorties. Of these, 950 were fighter combat sorties, 90 fighter bomber sorties and 10 helicopter sorties. All these missions were flown during the period from October 16 to October 18 to protect vital targets and military concentrations as well as to defeat the enemy air force which tried to launch concentrated air attacks against Egyptian airfields. Egyptian aircraft also flew air defence missions over Port Said sector. Israeli ground forces east and west of the Canal in the Deversoir area were attacked by Egyptian aircraft and 12 Israeli aircraft were shot down by the Egyptian Air Force. Because of the gap created in the missile umbrella on the west of the Canal, through which Israeli aircraft could freely operate and provide support to their troops, the Egyptian Air Force had to vastly increase its flying effort to counter the Israeli air threat which was helping its ground forces to expand the bridgehead on the west side of the Canal.

48 Badri, Magdoub, and Zohdy n. 8, pp. 103-107.
49 ibid.
According to Palit, on October 17 the Egyptian Air Force joined the air battle in strength and flew a total of 1,500 sorties in support of ground forces. However, the Israeli Air Force taking advantage of the missile gap created by its ground forces, could also come in good strength and finally gained command of the air in the skies over the bridgehead.\(^{50}\) (Progress of October 1973 War is shown in maps at appendices L, M, and N.)

**Final Outcome of the War**

The thorough planning and preparation on two fronts and a surprise offensive provided the Arabs with victories on both fronts, the Suez and Golan. Egypt was to cross the Canal and establish bridgehead on the eastern bank and thus achieved its limited objective. On the Golan front, Syria also was able to push back the Israeli forces from the Golan Heights and capture almost the entire region which Israel had occupied after 1967 War. The successes on both fronts proved that the Arabs were brave soldiers and restored their fighting morale which they had lost after the Arab Israeli War of 1967. In the second half of the campaign, Israel received from the United States latest models of Phantoms and Skyhawks fitted with the most sophisticated electronic warfare equipment, and precision-

\(^{50}\) Palit, n. 6, p. 140.
guided munitions like the surface-to-air Hawk missiles and Tow anti-tank missiles in large numbers. The United States provided intelligence from the its satellites and SR-71 reconnaissance aircraft. Then Israel mounted a counter-offensive, in which the Israeli forces crossed the Canal and established a bridgehead on the west bank and cut-off the Egyptian Third Army. At this stage the war ended as President Sadat of Egypt said that he was not going to fight a war with the US which could destroy all his gains.51

The Arab-Israeli War of October 1973 has been called the War of No Victor, No Vanquished by Edgar O'Ballance.52 On the other hand Golda Meir claimed; ˝We won the war, and I am convinced that in their hearts of hearts the political and military leaders of both Syria and Egypt know that they were defeated again, despite their initial gain.˝53

However, Golda Meir also accepted that the war was a near disaster, a nightmare for Israel. According to her, militarily speaking, it was a stand-off: ˝Even though the Egyptians gained

51 Sadat, n. 1, p. 261.
52 O'Ballance, n. 15.
some 300 sq miles of Israeli held territory on the east bank of the Canal, the Syrians lost almost the same amount of terrain in the north. Politically, from a situation of 'no-peace, no war' it changed to 'no-victor, no-vanquished', the Arabs perhaps gaining more than Israel.'

The general view is that by the end of the war Israel had regained the lost military advantage. It had advanced further into Syria and posed a threat to the capital city of Damascus itself. However, despite Israeli military superiority towards the close of the campaign, the military balance in the Middle East had fundamentally changed. The political gains which the Arabs made by the use of the 'oil weapon' was of immense importance in future of international relations in the Middle East. Another important outcome of the war was that the Arabs had broken the myth of Israeli invincibility which had prevailed since the Arab-Israeli War of 1967. Another assessment described the outcome of the war as 'a military gain for Israel but a psychological victory for the Arabs.'

Section 2 - Military Doctrine and Strategy

The Arab High Command

The doctrine of the Arab forces and their strategy was primarily based on their experiences in the June 1967 War with Israel. Israel had then mounted a surprise pre-emptive air attack on all its Arab neighbours and destroyed their air forces on the ground and thus achieved total air superiority and command of the skies over the region. Under this protective umbrella of superior air power, Israeli ground forces had moved without much opposition into the entire Sinai, on the Golan Heights and the West Bank and occupied large chunks of Arab territory. Therefore, the Arabs knew that they could not win a war without gaining air superiority, which was not possible. So they decided on a strategy of limited objectives. The Egyptian plans called for crossing the Canal and establishing a bridgehead on the east bank under SAM cover. 57

After establishing a bridgehead on the east bank of the Canal, the Egyptian plans envisaged a move upto the passes under the missile umbrella only when the positions on the east bank had been consolidated. The Syrian objectives, on the other hand, 57

57 Kenneth Hunt, `Military Lessons', *Survival* Jan-Feb 1974, p. 4.
were not so limited and the Syrian plans called for regaining all the territories of Golan Heights which Syria had lost to Israel in the War of 1967. In the joint plans of Egypt and Syria, Jordan was to pose a potential threat across her borders, without actually opening hostilities. Jordanian forces were to take part on the Syrian front so as to avoid direct attack by Israel on Jordan.

The Egyptian air strategy was mainly defensive and the command of the skies over the Canal Zone had been entrusted to surface-to-air missiles which were expected to cause heavy attrition to Israeli aircraft supporting Israeli forces on the ground.\footnote{ibid.} It was planned to employ Egyptian Air Force for interdiction and close support missions in the beginning of the war and wait till the Israeli Air Force weakened to take it on in direct confrontation. In the event, this situation did not come about as the United States mounted a massive airlift and more than made up for the losses suffered by the Israeli Air Force.\footnote{Badri, Magdoub and Zohdy, n. 8, p. 83.}

\textbf{Israeli Objectives and Strategy}

The Israeli war plans against the Arabs relied mainly on
the quality of its Air Force and its immediate pre-emptive capability against the Arab air forces as experienced in the War of 1967. After the Air Force had achieved the command of the air, and simultaneously the ground forces had been mobilised, the Israeli tank forces supported by the air force would mount a counter-attack without interference from the enemy's air forces. However, the surprise joint attack by Egypt and Syria on two widely separated fronts, put a great deal of pressure on Israel. During the first few days of the fighting when the Israeli forces were being mobilised and the strength in the fighting lines was thin, the Egyptian and Syrian assault made good progress. During the same period, the Israeli Air Force, trying to stem the tide of Arab advance, met with a very sophisticated SAM and anti-aircraft gun defence system from which it lost 70-80 aircraft in the first 24 hours, a very high rate of attrition.60

The Israeli military doctrine was greatly influenced by its experiences of the June 1967 War. The most important factor in evolving a strategy against the Arabs was the 'command of the air'. 'Control of the skies, became the cardinal rule of military thinking, a sine qua non. The Israelis found it

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difficult to conceive of an enemy initiating war unless he could secure air control or, at least, amass enough air power to support ground operations.'\textsuperscript{61} It was correctly assessed in Israel that the balance of air power was in her favour as the Israeli Air Force had achieved complete air superiority in the region and it was expected to maintain this favourable balance till the middle of the 1970s. While this was a correct evaluation of the situation as far as air to air balance was concerned, the Arabs, with the advice of their Soviet friends, made plans to upset the balance by ground-based counter-air systems. This was the only way in which, the Arabs felt, they could neutralise the Israeli Air Force. Major General Ezer Weizmann, a former Commander of the Israeli Air Force later commented that after the Six-Day War of June 1967, the Russians had learnt an important lesson which was included in their military doctrine. This envisaged the enemy's attempt to control the air over the tactical area and emphasised the need for anti-aircraft guns and missiles to counter the enemy's air power and prevent it from gaining command of the air over the battlefield, by deploying dense anti-aircraft systems.\textsuperscript{62}


\textsuperscript{62} ibid, p. 460.
Describing the origins of strategic thinking in Israel before the Yom Kippur War, General Chaim Herzog says: "The origins of the strategies for the Yom Kippur War can be found to a very considerable degree in the Six-Day War of 1967 which had profound effect on both sides of the conflict, changing in no small measure, Israel's social and political life and dictating basic changes in its strategic thinking."

The Arabs with the help of Soviet advisers had done a total analysis and evaluation of the of 1967 war and had made important changes in their concepts, strategy and organisation. An independent Air Defence Command in Egypt, and a high density of anti-aircraft weapons in the tactical area was the outcome of these evaluations. On the other hand, Israel had learnt no lessons from that war and still continued to rely on the superiority of its air force.63

According to him the main pillar of Israeli strategy in 1973 remained a pre-emptive surprise air attack as in 1967, based on geography of a narrow state with Arabs surrounding it on all sides.64

63 Herzog, n. 19, p.2.
64 ibid, p. 3.
Influence of Air Power on Strategy

While Israel had relied on its air force to respond to an Arab offensive to regain their lost territories, Egypt, Syria, and Jordan could not forget the experience they had of the surprise pre-emptive air attacks by the Israeli Air Force during the Six-Day War of June 1967 when they had lost most of their aircraft on the ground within the first few hours of the hostilities. Lessons of this experience convinced the Israelis that Egypt could not go to war against Israel unless it was equipped with aircraft which were comparable in performance to those with the Israeli Air Force. This also was the ground for the assessment by the Israeli intelligence that Egypt could not go to war till 1975. Therefore, the offensive by Egypt and Syria in 1973 was a complete surprise.65

Egypt and Syria, on the other hand, to counter the Israeli Air Force over the tactical area, deployed surface-to-air missiles and anti-aircraft gun systems to ensure that the enemy aircraft did not interfere with their ground forces advancing across the Suez Canal or on the Golan Heights. In the event, these SAM systems and AA guns shot down a large number of Israeli aircraft, thus enabling Egypt and Syria to achieve their initial

65 ibid, p. 24.
Section 3 - Performance of New Technology Weapons

Surface-to-Air Missiles

The Egyptian plan was to employ dense missile and gun fire to counter the Israeli Air Force. For this purpose, a strong air defence barrier was laid out all along the Canal about 70 miles in length. Intending to strike first, the Egyptians expected massive retaliation; their answer was to be the 'air Defence barrier', multi-lateral, multi-altitudinal, a combination of surface-to-air missiles, (SAMs), and guns. The missiles were the SAM-2, SAM-3, and SAM-6, the last completely new to the West."

The missile barrier could be activated at short notice and switched off entirely so as not to fire on Egyptian aircraft. There were in theory three elements in this air defence barrier: missiles, guns and fighter interceptor aircraft. However, in fact, the aircraft were not expected to fight Israeli aircraft in the barrier. That responsibility was entirely with the

67 O'Ballance, n. 15, p. 280.
missiles and guns.\textsuperscript{68}

The missile and gun systems protecting the Canal region are reported to have shot down 95 Israeli aircraft. Another 22 aircraft were shot down by the Egyptian Air Force over Egyptian territory.\textsuperscript{69} With such heavy losses Israel could not mount any effective air operations. However, the Israeli aircraft losses were soon made up by the United States emergency airlift. Israel received new Phantom aircraft fitted with ECM equipment, Shrike anti-radar missiles, and TV guided bombs for use against the Egyptian land-based air defence system.

In the intense war between Israeli Air Force and the heavy, interlocking belts of Egyptian and Syrian surface-to-air missiles during the first week of the war, Israel lost 78 aircraft. The main threat to the Israeli Air Force appeared from the newest Soviet supplied SAM, the low-altitude SA-6 Gainful, which was used in combat for the first time. The Israeli Air Force had to urgently seek effective electronic counter-measure equipment to counter this new threat. These high losses occurred because the Israeli Air Force was forced to mount close support missions during the early stages of the war to assist ground

\textsuperscript{68}
ibid, p. 282.

\textsuperscript{69}
Badri, Magdoub, and Zohdy, n. 8, p. 83.
forces against Egyptian and Syrian assault in the Sinai and the Golan Heights. 70

Losses to Israeli aircraft flying close support missions against Egyptian and Syrian forces advancing under missile and gun umbrella were high. "Syrian SAMs and anti-aircraft fire accounted for more than 30 Israeli aircraft flying over the Golan Heights in a single day." 71 The answer to SAM threat was evolved by Israel with the help of Electronic Counter Measure (ECM) and other counter measures such as chaff. Israel equipped both its fighter aircraft and helicopters with ECM pods. Helicopters were also employed on surveillance role to spot the firings of SAM missiles and warn the pilots of fighter aircraft to enable them to take avoiding action. Most Israeli losses of aircraft were credited to the SA-6, man-portable SA-7, and multi-barrel Soviet ZSU-23-4 SP gun system which was fitted with four radar controlled 23 mm anti-aircraft guns deployed to protect the SA-6 missile sites. 72 Tactics used during missile war between Egyptian SAMs and Israeli aircraft are shown graphically in figures on the following pages.

71 ibid.
72 ibid, p. 15.
Figure I SAM-6 VERSUS ECM

Acquisition and launch phase

50,000 ft
(10 miles approx)

Midflight phase

Target tracking radar

Missile radar
(guidance and command)

Terminal phase-Heat seeking

Missile computer
interception course

Angle of missile vision

Heat seeking guidance
System picks up, jet exhaust

Source: Sunday Times Insight team, The Yom Kippur War
Figure II SAM-6 AND SAM-2/3 VERSUS ECM

Against missiles with radar guidance and control (effective against SAM-2 and SAM-3)

- Chaff a shower of metalized strips dropped from aircraft produces multiple radar reflections
- Electronic alarm warns that SAM-2/3 radar is locked on

ECM (electronic countermeasures) pods fixed to aircraft wings transmit "noise" at radar frequencies to jam the missile guidance channels

Against heat-seeking missiles such as SAM-6 (in homing stage)

- Surveillance helicopter spots SAM-6 launch and gives warning
- Violent evasive maneuvers aimed at turning "cold side of aircraft toward missile and sharpening missiles turning angle
- High heat intensity flares to confuse missile's infrared guidance system as it tries to home on jet exhaust

Figure III SAMs VERSUS ECM

**Heat seeking countermeasures**
- High temperature jet exhaust
- Lower temperature decoys
- Filters in infrared sensor distinguish between frequency of radiation from jet engine and decoy

**Electronic countermeasures**
- Increased power used to "burn through" jamming
- Radar "hops" between frequencies to avoid jamming

Missile tracking radar
Target radar

SA-6 Gainful surface-to air missile supplied to Egypt by the Soviet Union was assessed to be very effective weapon during the October War and provided conclusive evidence of Soviet application of advanced technology of rocket/ramjet propulsion system as well as guidance in at least four different frequencies extremely difficult to counter.73

SA-7 man-portable missiles which were countered effectively by decoy flares in the initial stages of the war, became more sophisticated and advanced in discrimination towards the later period and avoided homing on flares. According to the Pentagon sources, "the missile's avoidance of flares in the Arab-Israeli War indicated that the troops using the weapon possessed advanced technical expertise."74 Another reason why the SA-7 would have avoided the decoy flares was that the heat intensity of the flares may not have matched the exhaust heat of the aircraft. If filters were used and the wavelengths set for the aircraft's exhaust, the missile would avoid the flares. The SA-7 was deployed for the first time in tracked vehicles with eight SA-7 missiles on each vehicle and could be fired in salvos of


74 "SA-7 Avoids Homing on Flares" in Aviation Week and Space Technology, November 5, 1973, p. 17.
four or eight. The SA-7 system was also provided with a radar for acquiring the target and directing the missile towards the target.\textsuperscript{75}

**US Smart Guided Weapons Against Soviet SAMs**

According to Barry Miller, the United States Government had supplied Israel towards the later stages of the war a limited amount of advanced avionic equipment and electro-optical "smart" guided weapons which were earlier banned from export to the Middle East. The electro-optical weapons were considered to be particularly effective in dry desert terrain where lack of vegetation makes target detection and identification easy.\textsuperscript{76}

The US re-supply to Israel is said to have included the following new equipment.

1. Hughes Aircraft's Maverick TV guided air-to-ground missiles which were highly successful against tanks, trucks, and other hard targets. It was fired from Israeli McDonnell Douglas F-4 Phantom aircraft during the last days of the war.

\textsuperscript{75} ibid.

\textsuperscript{76} Barry Miller, "US Equips Israel with 'Smart' Guided Weapons!", *Aviation Week and Space Technology*, November 5, 1973, p. 18.
2. Northrop's target identification system, electro-optical (TISEO), an optical identification, friend or foe device or "extended eyeball" as it is called in the USAF. This uses a videocon TV camera with zoom lens, fitted in a barrel-shaped projection in the forward edge of the left wing of the F-4E Phantom. This equipment helped the Israeli pilots in recognising targets at a distance of 3-4 miles and beyond visual range.

3. Hughes Aircraft's 3,000-meter range, tube-launched, optically tracked, wire-guided TOW anti-tank missile which could be employed from tripod mounted jeeps, personnel carriers, or from helicopters, as in Vietnam. According to reports the TOW missiles launched by Israel during the war scored 100 per cent hits, beating all previous records in accuracy.

4. The United States re-supplied Israel with two types of electro-optical bomb system (HOBOS); and the Martin Marietta Walleye 1. During the war Israel received the MK 84 2,000-lb electro-optical version of HOBOS.

5. The United States also re-supplied Israel with Raytheon Sparrow radar guided air-to-air missiles and the Raytheon basic Hawk low-medium altitude air defence missile along with its radar.
6. In the same period, Israel received from the United States electronic counter measure (ECM) equipment and chaff dispensers, along with chaff and flares. The ECM equipment sent to Israel included USAF F-4 Phantom ECM pods, fitted with Westinghouse ALQ-119 modulated noise jammers, which cover a wide band of frequencies.77

New Technology Missile War

During the Six-Day War of June 1967, the Arabs were in possession of some surface-to-air missiles of the SA-2 type, but these did not play any significant part in that war. However, the October War of 1973 was entirely different; hundreds of missiles of all types were fired against aerial and ground targets and because of their much higher accuracy, varying from 90 to 100 per cent, caused a very high attrition rate. The Yom Kippur War witnessed not only a change in Arab strategy but also the employment of a new family of weapons; the battlefield of tactical guided missiles. These missiles, backed by radar controlled guns, challenged the air superiority that the Israeli Air Force had so far enjoyed.78 These weapons inflicted heavy losses on the Israeli aircraft and denied tactical air power

77 ibid.
freedom of battlefield interdiction. Further, assistance of
ground forces became necessary for the suppression of missile air
defences on the Suez Canal before the air force could enter the
tactical area. There is a very significant lesson to be learnt
from this war: the air superiority to the Israeli Air Force was
denied not by the Egyptian Air Force but by the ground-based
missiles of the Air Defence Command. In this battle scenario,
the effectiveness of close support operations need to be re-
examined as a viable air strategy and more importance may have
to be given to interdiction and counter air missions. 79

The effectiveness of air support missions in the tactical
area dense with ground-based anti-aircraft missiles and guns
faced a serious degradation after the experience of the 1973 War.
The Israeli Air Force which had a tremendous reputation as a
hard-hitting and air superiority winning element of Israeli
strategy and which was the first and the last line of defence
of Israel, proved totally inadequate against the new technology
anti-aircraft missiles. The command of the air over the tactical
area of the Canal Zone had been lost by the Israeli Air Force
to the Egyptian ground-based anti-aircraft missiles. In this
situation, the role of the air force and army became reversed;

79
Hans F. Roser, (Wg Cdr RAAF) `Defence Suppressin: Mission or
the Israeli ground forces had to support the air-force, and attack and neutralise the missile sites before the air force could operate effectively over the tactical area.\textsuperscript{80}

General Herzog describes this need during the Israeli crossing of the Canal, "$\text{the first mission of our armoured force on the West Bank of the Suez Canal was to knock out the surface-to-air missile sites, which it did effectively. That force literally swept the area for the air force, and it was then free to attack at will.}$"\textsuperscript{81} Thus according to General Herzog, the Israeli Air Force needed ground action against the missiles before it became truly effective. One can infer from this that unless certain elements of SAM and AA gun defences were eliminated, the Israeli Air Force was not free to operate at will, and, therefore, did not possess air superiority. In this situation, it could be used only in the defensive role which is totally unsuited to air power doctrine.

Guided Missiles Cause High Attrition

Precision guided missiles and munitions of different varieties like surface-to-air, air-to-air, air-to-surface,

\textsuperscript{80} Donald J. Alberts (Major) "$\text{A Call From the Wilderness}'$, \textit{Air University Review}, November-December, 1976, pp. 38-39.

\textsuperscript{81} Chaim Herzog (General), "$\text{The Middle East War, 1973}'$, RUSI Journal, March 1975, p. 15.
ship-to-ship, and anti-tank missiles like the TOW and Sagger took a heavy toll of aircraft, tanks, and ships on both sides of the fighting line. Comparative tables giving the losses of aircraft, tanks, and ships during the Six-Day war of June 1967 and of October 1973 are given below. The high figures on the Israeli side during 1973 clearly show the impact of new technology weapons with the Arabs which destroyed more than 100 aircraft and 800 Israeli tanks.

Table 1. Loss of Military Equipment in the 1967 War

<table>
<thead>
<tr>
<th></th>
<th>Aircraft</th>
<th>Tanks</th>
<th>Ships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt/Syria</td>
<td>390</td>
<td>650</td>
<td>4</td>
</tr>
<tr>
<td>Israel</td>
<td>40</td>
<td>100</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td>430</td>
<td>750</td>
<td>4</td>
</tr>
</tbody>
</table>


Table 2. Loss of Military Equipment in the 1973 War

<table>
<thead>
<tr>
<th></th>
<th>Aircraft</th>
<th>Tanks</th>
<th>Ships</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt/Syria</td>
<td>450</td>
<td>1,900</td>
<td>(13)</td>
</tr>
<tr>
<td>Israel</td>
<td>105</td>
<td>800+</td>
<td>(3)</td>
</tr>
<tr>
<td>Total</td>
<td>555</td>
<td>2,700</td>
<td>(16)</td>
</tr>
</tbody>
</table>

(Figures within brackets unconfirmed)

Soviet and US Re-supply of Lost Equipment

The loss of military equipment on both sides was so heavy that it would have been difficult to continue the war except for the fact that early during the war the Soviet Union and the United States commenced re-supply of lost equipment by mounting massive airlifts to Syria, Egypt and Israel. The details of the airlift from the United States and the Soviet Union are given in the following table.82

Table 3. Airlift During the October 1973 War

<table>
<thead>
<tr>
<th></th>
<th>US</th>
<th>El-Al</th>
<th>USSR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorties</td>
<td>564</td>
<td>250</td>
<td>935</td>
</tr>
<tr>
<td>Wt in tons</td>
<td>22,400</td>
<td>5,500</td>
<td>16,000</td>
</tr>
<tr>
<td>Round trip distance</td>
<td>14,000</td>
<td>14,000</td>
<td>1,400</td>
</tr>
</tbody>
</table>

The US re-supply included ordnance stores, electronic warfare equipment, aircraft replacement and tanks along with anti-tank weapons and ammunition.83

From the figures of aircraft losses and type of re-supply

83 Kissinger, n. 10, p. 496.
it is evident that the air and missile war was highly intense. In addition to the normal air doctrine of aircraft versus aircraft to gain command of the air, in this war, new technology guided SAMs used against aircraft took a heavy toll. A comprehensive analysis of losses in 1973 war is given in table 4.

Table 4 Land, Air and Naval Losses: 1973 War

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th></th>
<th></th>
<th></th>
<th>Other</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Israel</td>
<td>Arab</td>
<td>Egypt</td>
<td>Syria</td>
<td>Jordan</td>
<td>Iraq</td>
<td>Arab</td>
</tr>
<tr>
<td>Casualties</td>
<td>2,838</td>
<td>8,528</td>
<td>5,000</td>
<td>3,100-</td>
<td>28</td>
<td>218-</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>3,500</td>
<td></td>
<td></td>
<td></td>
<td>260</td>
<td></td>
<td></td>
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<tr>
<td>Wounded</td>
<td>8,800</td>
<td>19,549</td>
<td>12,000</td>
<td>6,000</td>
<td>49</td>
<td>600</td>
<td>300</td>
</tr>
<tr>
<td>Prisoners/Missing</td>
<td>508</td>
<td>8,551</td>
<td>8,031</td>
<td>370-</td>
<td>--</td>
<td>20</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Equipment Losses</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Battle Tanks</td>
<td>840</td>
<td>2,554</td>
<td>1,100</td>
<td>1,200</td>
<td>54</td>
<td>100-</td>
<td>?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Other Armor</td>
<td>400</td>
<td>850+</td>
<td>450</td>
<td>400</td>
<td>--</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Artillery Weapons</td>
<td>?</td>
<td>550+</td>
<td>300</td>
<td>250</td>
<td>--</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>SAM Batteries</td>
<td>--</td>
<td>47</td>
<td>44</td>
<td>3</td>
<td>--</td>
<td>--</td>
<td>?</td>
</tr>
<tr>
<td>Aircraft</td>
<td>103</td>
<td>392</td>
<td>223</td>
<td>118</td>
<td>--</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>Helicopters</td>
<td>6</td>
<td>55</td>
<td>42</td>
<td>13</td>
<td>--</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Naval Vessels</td>
<td>1</td>
<td>15</td>
<td>10</td>
<td>5</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Performance of the Israeli Air Force

According to news reports published soon after the war, the "Israeli Air Force under Maj General Benjamin Peled, was as decisive in turning the tide of battle in October 1973 war as it was during the 1967 war, although it played a different and more complex role." It achieved the following major successes.84

1. For the first few days on the Golan Front, the Israeli Air Force was the only effective force opposing the Syrian armoured assault of 1,000 tanks which it was able to blunt.

2. It attacked and destroyed 50 per cent of Syrian mobile SAMs.

3. During air-to-air combat it shot down about 370 Arab aircraft with a loss of only four aircraft of its own, and thus virtually made the Arab air power non-effective.

4. It badly damaged the Syrian economy by strategic bombing.

84 Herbert J. Coleman, "Israeli Air Force Decisive in war", in Aviation Week and Space Technology December 3, 1973, p. 16.
One of the main factors leading to the success of Israeli Air Force was its centralised surveillance, command and control centre which controlled air operations on both the Suez and Golan fronts. This single point of control enabled it to switch aircraft from one front to the other at short notice depending on the situation on the battlefield.\footnote{ibid, p. 21.}

**A Self-Confident Egyptian Air Force**

President Sadat congratulated General Hosni Mubarak, the Egyptian Air Force Chief, for achieving total success in the 1973 war. The war on the Egyptian front began with an air strike against targets in the Sinai, and the lines of communications with Israel were cut. According to Sadat, with this admirable air strike the Egyptian Air Force recovered all it had lost in the 1967 war. Hosni Mubarak worked wonders. He used all the aircraft available, even for training, which he converted into fighters by providing them with cannons and rockets. The MiG-17s being sub-sonic, were used very skillfully by our pilots in dog-fights with Phantoms and Mirages. The Egyptian Air Force achieved an epic feat-heroic and glorious. It was the direct opposite of what the Soviet Union had expected.\footnote{Sadat, n. I, p. 249, 263.}
Main Feature: New Technology Weapons

One of the most important aspect of the war was its highly "technological" nature. Guided missiles, precision guided weapons, and electronic warfare equipment were used on a large scale for the first time in an intense war. In a way, it was a proving ground for new technology weapons of the United States and the Soviet Union from which a number of lessons emerged leading to improvement in the performance of these weapons and rethinking about the strategy and doctrine of their employment as well as organisational changes in the integrated deployment of armed forces. Front-line Egyptian and Israeli-fighters during the war with their performance figures are shown at Appendix 'O'.

Section 4 - Lessons of 1973 War: Air Power With New Technology Weapons

Importance of Military Lessons of Wars

The study of military history and important battles has been the main source for evolving the principles of war, doctrines, and strategies, as well as military organisations during modern times. From Clausewitz to Liddell Hart and Fuller,

87 Keesing's n. 22, p. 261-75.
this study of military campaigns has been the continuous thread linking the evolution and growth of better strategy and tactics to win a cost-effective victory. Armies and navies had the benefit of the experience of centuries of land and sea warfare on which to base their fundamental guiding principles. While air power is the child of the twentieth century, with a comparatively short period of experience, there has been an exponential rise in the importance of air power as a battle winning factor. The main reason for this dominance of air power in modern warfare has been the ability of air power to remain at the leading edge of rapid advances in military technology. The technological race for better aircraft, weapon systems, and command and communication structures has been based on the lessons of previous air campaigns. Since the Second World War, technological advances have resulted in the introduction of jet engines, supersonic aircraft, guided missiles, electronic warfare equipment, flight refuelling, airborne warning and control systems, high altitude high speed reconnaissance aircraft, and space-based satellite surveillance systems. During the Arab-Israeli War of 1973 most of these new technology weapon systems were used. Some of the important lessons of the air war are analysed below.

**Lessons in Aerial Combat**

The Israeli Air Force which had a reputation of being second
to none, was able to achieve victory in air-to-air combat missions against the Arab air forces.\textsuperscript{88} Despite gaining victories in air combat, the Israeli Air Force was not able to gain air superiority in the tactical area because of dense deployment of SAM systems which caused heavy losses to Israeli aircraft. In air-to-air combat, most of the Arab aircraft shot down by the Israelis were hit by AIM-9D Sidewinder, and Israeli produced Shafrir air-to-air missiles and the remaining by cannons fitted to the aircraft. In figures this worked out to be 25 percent of all aircraft downed by Sidewinders; about 40 per cent by Shafrir; less than five per cent by AlM-7E radar guided missiles and about 30 per cent by guns and cannons. While the better performance of the Israeli Air Force in air-to-air combat was mainly because of better training, it clearly benefited from superior air-to-air missile technology.\textsuperscript{89} An analysis of air losses of Israel and the Arabs is given in the table on the next page.

\textsuperscript{88}

\textsuperscript{89}
ibid, p. 87.
Table 5 Aircraft Losses in 1973 War

<table>
<thead>
<tr>
<th></th>
<th>Arab Israel Total</th>
<th>Egypt</th>
<th>Syria</th>
<th>Iraq</th>
<th>Arabs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fighter</td>
<td>103</td>
<td>390</td>
<td>222</td>
<td>117</td>
<td>21</td>
</tr>
<tr>
<td>Bomber</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>6</td>
<td>55</td>
<td>42</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>109</td>
<td>447</td>
<td>265</td>
<td>131</td>
<td>21</td>
</tr>
<tr>
<td>Air-to-Air</td>
<td>21</td>
<td>287</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To SAM</td>
<td>40</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To AAA</td>
<td>31</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Misc. or Unknown</td>
<td>15</td>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friendly Forces</td>
<td>2</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>109</td>
<td>447</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Damaged</td>
<td>236</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Repaired in One Week 215 UNKNOWN


The above table also indicates that more than 70 per cent of Israeli aircraft were shot down by ground-based anti-aircraft weapons and Israel lost only 20-30 per cent in air-to-air combat.
On the other hand, the losses to the Egyptian Air Force were mainly in air combat, about 80 per cent, and by SAMs and AA guns about 15 per cent. This clearly indicated an offensive strategy by Israel and a defensive strategy by the Arabs in the air battles. The results of attrition show that while Israel had technologically better aircraft and air-to-air guided weapon systems, the Arabs had more advanced SAMs and AA gun systems.

**Effectiveness of Close Air Support Missions**

The most controversial role of the Israeli Air Force was the flying of close air support operations in which it lost 70-80 aircraft in the early phase of the war on the two fronts from ground based weapons. The cost effective employment of air power in this role is still being debated not only in Israel but in other interested countries as well. The main question is: should air power be used at such cost for close air support when the benefits are marginal? The problem with Israel was that there were no other means of stemming the Arab advance on two fronts till the arrival of reserves except the use of the Israeli Air Force.90

According to General Chaim Herzog, "to a degree air power

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90 ibid, p. 90.
will obviously not be as influential as it has been and will affect the battlefield less than it did. The proliferation of light portable missile launchers in the front line means that close support will be the exception to the rule in future with the air force being obliged to concentrate on isolating the field of battle, maintaining supremacy in the air, and destroying forces in and near the field of battle.' 91

Interdiction Missions

The Israeli Air Force was able to mount interdiction missions only after the first few days since it was not prepared for a surprise attack from the Arabs on two fronts. Such missions were carried out during the later phase of the war after some of the ground-based air defence missile sites were neutralised. The Egyptian and the Syrian Air Forces mounted interdiction sorties against targets in the Sinai and on the Golan Heights. While such attacks did not result in major damage to Israeli installations, they diverted a certain amount of effort to air defence, at a time when the Israeli aircraft were critically needed for close support role. 92

91 Chaim Herzog, n. 19, p. 261.
92 Cordesman and Wagner, n. 87, p. 97-98.
Counter-air and Strategic Air Offensive

The attacks by the Israeli Air Force mounted against the Egyptian airfields did not produce the same extent of damage to the Egyptian aircraft as they did in 1967, since the Egyptian aircraft were now protected by hardened concrete shelters. For a comparative assessment of losses in 1967 and 1973 please see the table below:

Table 6 Airbase Attacks by the Israeli Air Force in 1967 and 1973

<table>
<thead>
<tr>
<th></th>
<th>1967</th>
<th>1973</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAF Sorties Against Airfields</td>
<td>490</td>
<td>468</td>
</tr>
<tr>
<td>(at least)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arab Aircraft Destroyed on the Ground</td>
<td>370</td>
<td>22</td>
</tr>
<tr>
<td>IAF Losses in Airbase Attacks</td>
<td>19</td>
<td>7</td>
</tr>
<tr>
<td>IAF Kill-to Loss Ratio</td>
<td>19:1</td>
<td>3:1</td>
</tr>
</tbody>
</table>

On the Syrian front, the Israeli air attacks on their airfields destroyed several Syrian aircraft. Israel also mounted air attacks on key Syrian targets like oil refineries and sea-ports. The results of such air attacks were considered by Syria to be of no more than nuisance value. There was no substantive effort on the part of the Arabs towards strategic strikes inside Israel mainly because of the threat from the Israeli Air Force which had command of the air over its own territory.\footnote{ibid.}

New Technology Used with Old Concepts

After the war, General Ahmed Ismael, Commander of the Egyptian forces came to the conclusion that tanks had lost their mastery—not their value—as a result of the development of anti-tank missiles and the same applied to manned aircraft as a result of development of anti-aircraft missiles. Further examination of the problem led to the view that tanks needed thicker and stronger armou rplating against man-portable missiles, and manned aircraft were not rendered useless by anti-aircraft missiles. On the contrary, their flexibility and destructive concentration of fire power were demonstrated once more when, against great odds, they stemmed the Syrian advance on the Golan and supported the armoured breakthrough across the Canal to the
West Bank. An important lesson that emerged from the experience of heavy losses to aircraft from air defence missiles was the need for suitable electronic counter measure equipment which could be used for protection of these aircraft from SAMs.\textsuperscript{94}

Most of the defence analysts, evaluating the lessons of the war agreed that significant changes in weapons due to new technologies, and resultant changes in organisation, strategy and tactics had made the study of this war as one of the most useful in the post-World War II period. The war was actively supported by the two superpowers who supplied the belligerents with the latest technology weapon systems, and for them the war became the proving ground for testing all the weapons of a contemporary fighting machine. French General Andre Beaufre in a seminar at Cairo soon after the war drew the following lessons:\textsuperscript{95}

1. Anti-aircraft and anti-tank missiles proved very effective weapons and were responsible for causing a very high rate of attrition on attacking Israeli aircraft and tanks.

2. From the outcome of the war, it became evident that the

\textsuperscript{94}  
\textit{Sunday Times}, n. 11, p. 489-491.

\textsuperscript{95}  
\textit{Badri, Magdoub, and Zohdy}, n. 8, p. 209.
impact of new technologies would be to give advantage to the side which had it till the counter measures were taken by the opponent.

3. Arab air forces were well-dispersed and protected, ground troops were given protection from enemy aircraft by SAMs, and aircraft operated away from missile zones.

In another symposium held at Cairo, French General Albert Morglen described the October war as the first conflict of a conventional type in which new technology weapons were used for the first time in large quantities. In this context the main characteristics of the war were as follows:

1. The surprise offensive by the Arabs on two fronts.
2. The capacity of Israeli reaction.
3. The massive use of modern weapons; missiles, ECM, and satellite reconnaissance.
4. The tactical efficacy of anti-aircraft and anti-tank missiles.
5. The importance of replacing material losses.

According to General Morglen, the two main lessons of the October war were the unexpected effectiveness of anti-tank and anti-aircraft missiles (SAMs), and an incredibly successful
launching of a surprise general offensive by the Arabs.96

In a symposium held at Tel Aviv after the October War, Prof Shimon Shamel of Tel Aviv University said that the Arabs had devised their strategy for the 1973 war based on the lessons of June 1967 War. 'It was evident that the Arabs had learnt their lessons well and knew the importance of first strike and the overwhelming advantage derived from surprise. They evidently learnt that it was of great importance to neutralise those elements which constituted Israel's striking power: air and armour. They also learnt the importance of preventing the Israelis moving their forces from one front to the other, and tried to conceive and implement a plan according to which Israel would have to fight on two fronts simultaneously.'97

Maj General Benjamin Peled, Chief of the Israeli Air Force, said at the symposium that the major difference between this war and the previous ones was that the Israeli Air Force was asked to change from an offensive to a defensive strategy. 'The results of this strategy', according to him, 'were that all

96 Cairo International Symposium, n. 18, pp. 139, 148.
attempts of the two enemy air forces to play any role were crushed and frustrated from the outset. Air superiority allowed our forces to mobilise, move and act with no meaningful interference from the enemy air. This is nothing to be scoffed at under the situation we were in the beginning.'

In tactical, air-to-surface missions, the Israeli Air Force destroyed 46 missiles sites out of 62, while 10 sites were destroyed by ground forces. Israeli air superiority in Port Said and Gaza prevented Egyptian efforts to cut off supplies and reinforcements to Gaza. Air support to ground forces in contact with the Third Egyptian Army resulted in heavy casualties to armour and other equipment. Further, by Monday noon October 8 all bridges across the Canal were blown up by Israeli air attacks. After that only four of them could be used at night for ferrying armour. General Peled described the quick buildup of an Israeli bridgehead across the Canal on the West Bank due to the very effective close air support provided by the Israeli Air Force.

Emphasising the importance of ECM to air operations,

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98 ibid, p. 238, 240.
99 ibid, p. 241.
General Hod, a former Chief of the IAF said that, "an ounce of ECM is worth a pound of additional aircraft". On the other side of the fence, according to Edgar O'Ballance, General Gamasy of Egypt said that, "the war was begun and terminated by the Egyptian Air Force."\(^1\) He confirms that, "in the sophisticated sphere of new technology weapon systems like aircraft, missiles, radars, and ECMs and in the mad and extremely expensive race for technological superiority and one-up-manship, the slightest advantageous progression could mean disaster to the other side."\(^2\)

Egypt had created a separate Air Defence Command to look after the air defence of the country. This command had under its control, aircraft, missiles, AA guns and radars. On the other side, Israel had a centralised command and control centre (C\(^3\)I)* for control of air operation on both fronts.

The lessons from the October 1973 War were carefully analysed by Israel and Arabs as well as the two superpowers. During the last twenty years major changes in doctrine,

\(^1\) O'Ballance, n. 15, p. 306.
\(^2\) ibid, p. 341.

* C\(^3\)I : Command Control Communications, and Intelligence.
strategy, tactics and organisation have been effected to ensure better cost effective use of airpower.

For the purpose of our study, therefore, any conclusions based on the 1973 War only would not provide the factual state-of-the-art in the use of air power as it presents itself today.

It is necessary to conduct an assessment of the Lebanese War of 1982 and the Gulf War of 1991 to discover the impact of new technology air power, on strategies, tactics and doctrines as well as any organisational changes that were made for more effective performance.