
ARTICLES

Air Power in the Six-Day War

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ABSTRACT In the aftermath of Israel's stunning victory over Egyptian, Jordanian and Syrian forces during the 1967 Six-Day War, accolades for the victory were often showered upon the Israeli Air Force (IAF). Indeed, many believed that it had been Israeli air power that had been the decisive element in the war by first eliminating the Arab air forces and then obliterating the Arab armies in turn. While the IAF did play an extremely important role in the fighting, it was not the decisive element of Israeli victory, and its impact was felt in very different ways from the common perception. Indeed, an appreciation of the true role of Israeli air power in the war reinforces both the importance of psychological factors in combat, and the ability of air forces to have a psychological impact disproportionate to their physical impact.

According to the legends that have grown up around the war, on 5 June 1967 the Israeli Air Force (IAF) obliterated the Arab air forces and thereby won the Six-Day War before it really began. That morning, the first of the war, Israeli Mirages and Mystères swept down on the unsuspecting Egyptian Air Force at its bases and crippled it beyond repair. The IAF then visited the same destruction on the Jordanian, Syrian and finally the Iraqi air forces, gaining complete control of the skies in the first 12 hours of the conflict. Israeli fighter bombers were then free to smash the Arab armies, flying close air support (CAS) missions for Israeli ground units locked in combat with Arab forces, and battlefield air interdiction (BAI) missions to prevent Arab reinforcements from reaching the front. The pervasive Israeli air presence made it impossible for the Arab armies to move or fight in Sinai, on the West Bank or on the Golan. In short, the IAF was the decisive instrument of the stunning Israeli victory.

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This is the legend of Israeli air power during the Six-Day War. It gained wide currency after the war, and is frequently echoed by Arabs, Israelis and Westerners alike. Indeed, in Arab accounts of the Six-Day War, the IAF became a kind of *deus ex machina* – a supernatural force which the Arab armies could not possibly have been expected to overcome. In the words of King Hussein of Jordan, ‘The battle was waged against us almost exclusively from the air with overwhelming strength and continual, sustained air attacks on every single unit of our armed forces, day and night’.¹ To a certain extent, this rationalization allowed the Arab militaries to ignore flaws in their own ground forces by blaming their defeat on Israel’s omnipotent air force.

The impression of the might of Israeli air power had an important impact on military developments around the world at the time. The Israelis became so confident in the ability of their air force to act as ‘flying artillery’ that, after the war, they bought few artillery pieces in favor of more fighter-bombers – much to their regret in the October War of 1973.² In the wake of the Six-Day War, armed forces all over the world concluded that a powerful air force could not only supplement, but in some ways even supplant, a powerful army. The poor showing of Argentine ground forces in the 1982 Falklands War (especially when compared to the superb performance of their Israeli-trained air force) was, in part, a product of this mis-learned lesson. Even the United States (US) saw in the performance of Israeli Mirages specially-equipped with 30-mm cannon for tank-killing the need for a dedicated ground-attack aircraft and so developed the A-10 Thunderbolt, armed with its own 30-mm cannon.

The myth of Israeli air power and the Six-Day War persists to this day as an element in the larger debate over air power in US military strategy. Air power enthusiasts regularly cite the Six-Day War as the first time that air power was decisive in a ground war, and one of a quartet of wars in which air power was supposedly decisive – along with the Gulf War, Kosovo and Afghanistan.³

The impact of Israeli air power on the outcome of the Six-Day War has been exaggerated, however, and its contributions to the war have been misunderstood. Israeli air power was an important factor in the Israeli victory, but it was hardly all-powerful and it was not the decisive element of the campaign. The *physical* impact of Israeli air power was largely confined to preventing the Arab air forces from participating in the war, and destroying ‘soft’ military vehicles (trucks, jeeps, etc.) during the various Arab retreats. The IAF played a marginal role in the decisive ground battles, and here its principal impact was not physical, but psychological. As General Uzi Narkiss, one of the principal Israeli front commanders during the war put it, ‘The IAF was very

important...but not so much for the ground battles. Mostly for morale and for the absence of Arab air strikes that they gave us'.⁴

This is not to dismiss the influence of the IAF on the conflict. Although Israeli air power was not decisive, it still played a very significant role in the course of the war. It hindered the functioning of Arab command and control at all levels, prevented some reserves from reaching the battlefield in a timely fashion, helped to turn the retreat of the Arab armies into a rout and, most important of all, provided Israel's ground forces with the air supremacy that made every other operation considerably easier.

A reassessment of the role of Israeli air power in the Six-Day War not only improves our knowledge of that particular conflict, but also enriches our understanding of how air forces affect ground operations generally. The use of air power in the Six-Day War provides a fuller appreciation for both the extent to which air operations can shape ground operations, and the various environmental factors that can limit this impact. It also has important lessons to teach regarding how air power works its influence on ground forces. In particular, the Israeli experience in the Six-Day War provides a useful counterweight to the experience of US air forces in recent conflicts such as the Gulf War, Kosovo and Afghanistan.⁵ Indeed, the success of these US air campaigns were so great that they have become archetypes, from which all planning regarding the future uses of air power are derived. However, not all nations can count on the luxury of time and resources the US enjoyed in the Gulf War, Kosovo and Afghanistan, and the IAF air campaign against the Arab states illustrates what one of the finest air forces in the world can accomplish when forced to operate under stringent limitations (a lesson illustrated to a certain extent more recently by American air power in the invasion of Iraq). Thus the Israeli experience in the Six-Day War serves as a useful alternative model for the employment of air power in land warfare.

Over the past 60 years, most of the academic literature regarding air power has focused on the strategic air power debate – whether strategic bombing alone can coerce an adversary to make concessions.⁶ This article addresses another increasingly important debate within the military and policy-making communities, the extent to which air power can be the decisive factor in land warfare.⁷ Historically, air forces have supported armies in land warfare because, in the end, the war was always decided by which *army* prevailed. However, the Six-Day War was the first time that air power advocates claimed that it was an air force that had struck the decisive blows, while the Israeli army simply mopped up. Today, in the budget debates in Congress and the battles over strategy in the Pentagon, there is still bickering over whether the US Air Force should take

precedence over the US Army as the decisive tactical instrument in waging land warfare. Indeed, the military plan for the invasion of Iraq featured a fairly light ground force (given the size of the undertaking) under the assumption that US air power could carry much of the burden traditionally assigned to ground forces. The Six-Day War has some important lessons concerning this debate.

This article analyzes the role of Israeli air power in the Six-Day War and its relevance to current debates regarding air power and land warfare. It briefly recounts the course of operations during the war. It then disproves the myth that Israeli air power was the decisive factor in the war, and that its decisiveness was derived from its ability to destroy Arab armored fighting vehicles. Next, it draws out generalizations regarding the true impact of Israeli air power on the conflict as a whole. Finally, it culls lessons from the Israeli experience during the war regarding the more general question of the utility of air power. Drawing on the lessons of the Six-Day War, it compares the Israeli experience with US experiences over the past two decades and analyzes how air power affects the conduct of war and suggests how it can most effectively be employed in future conflicts.

The Course of the War: A Synopsis

Israel launched the Six-Day War with a devastating offensive counter-air campaign against Egypt, followed by similar efforts against Jordan, Syria and Iraq.⁸ In the early hours of 5 June 1967, the IAF launched an extremely well-planned and executed series of airstrikes against 18 Egyptian air bases. In three hours of constant hammering, the Israelis destroyed over 300 of Cairo's 450 combat aircraft, and killed 100 of 350 Egyptian combat pilots.⁹ While the IAF pummeled the Egyptian Air Force, the Syrians, Jordanians and Iraqis launched desultory air raids against Israel – all of which failed to find their targets and none of which did any significant damage – but which provoked Israel to visit the same destruction on them later in the day. The Israelis first turned on Syria, striking the airbases at Damascus, Marj Ruhayyil, Dumayr, Sayqal and T-4, and destroying roughly half the Syrian Air Force including all but four of its cutting-edge MiG-21s. The Syrians also lost four MiG-17s in air-to-air combat with the Israelis, while the IAF lost only one *Mystère* in the air raids.¹⁰ Although Tel Aviv had hoped to avoid war with Amman, the Jordanian air raid and Jordanian attacks on Israeli positions in Jerusalem, convinced Israel to dispatch eight IAF aircraft against Amman International and Mafraq airfields. The Israelis destroyed 18 of 24 Hunters and badly damaged another four.¹¹ Finally, at the end of the day (and on into the morning of 6 June), Israeli planes flew

500 miles across the Syrian desert and attacked Iraq's H-3 (al-Walid) airbase near ar-Rutbah, the westernmost Iraqi airfield, destroying 31 Iraqi planes on the ground and in the air.¹²

While the IAF eliminated the Egyptian Air Force, the Israel Defense Force (IDF) launched a major offensive against the Egyptian Army in the Sinai.¹³ The Egyptians deployed seven divisions and eight independent brigades with 100,000 troops, 950 tanks, 1,100 APCs and over 1,000 artillery pieces to Sinai in a defense-in-depth along the few main east-west corridors in Sinai.¹⁴ The Israeli army attacked with 70,000 troops and 700 tanks in six armored brigades, an infantry brigade, a mechanized infantry brigade and three paratroop brigades – most grouped into three divisional task forces, or *ugdot*.¹⁵ Beginning at 0800 hours, the three Israeli *ugdot* smashed through the Egyptian infantry divisions in their fortified positions. By the end of the first day, all three Israeli *ugdot* had broken through the fortified defensive lines of the Egyptian infantry divisions, and defeated Egypt's tactical reserves (armored brigades backing up each of the infantry divisions) with only minor losses. Two of the Israeli *ugdot*, those of Generals Tal and Sharon, were already racing for the Suez Canal and the passes through the line of mountains that run north-south in western Sinai. The Egyptians resisted fiercely but not effectively, and the Israelis won quickly and with relatively minor losses. The Israelis found that Egyptian units fought hard from their fortified defensive positions, but would not maneuver against the Israelis, nor would they shift forces once the IDF had broken through their lines or turned their flank. The Egyptian formations rarely counterattacked, and when they did, it was usually a clumsy frontal assault that the Israelis defeated quickly. By the end of the first day, Tal's reconnaissance elements were rolling westward toward the canal. On the second day, elements of General Yoffe's *ugdah* smashed a counterattack by Egypt's elite 4th Armored Division, and then ploughed through Egypt's second line of defense, manned by Cairo's 3rd Infantry Division, before joining Sharon and Tal's forces racing to the passes and the canal beyond. Late on the second day, small Israeli armored forces seized both the Mitla and Giddi passes, effectively sealing two-thirds of the Egyptian Army in central Sinai. Although the Egyptians badly outnumbered the Israelis at the passes, they could not break through, and were decimated in the fighting.

Israel launched its invasion of the West Bank only in response to Jordanian attacks, thus the IDF offensive there did not get started until mid-morning.¹⁶ Despite the excellent defensive terrain of the West Bank, the strong defensive positions the Jordanians had spent 19 years building and the fact that the Jordanians had correctly anticipated Israel's plan of attack and so had their forces deployed almost precisely

where Israel intended to attack, the Jordanians had little more luck than the Egyptians. The Jordanians marshaled roughly 45,000 troops, 270 tanks and 200 artillery pieces in the West Bank in nine brigades (seven infantry and two armored) and several independent battalions.¹⁷ Israel attacked with eight brigades (one armored, two mechanized and five infantry) with about 40,000 men and roughly 200 tanks.¹⁸ As in Sinai, on 5 and 6 June, Israeli ground forces cracked the Jordanian frontline infantry positions and then defeated Amman's armored reserves. During the daytime of 5 June, and later that night, Israeli forces broke through the Jordanian lines at Janin, Tulkarm, the hills along the northern face of the Jerusalem corridor, and in Jerusalem both north and south of the Old City. On 6 and 7 June, Israeli armor defeated Jordan's armored reserves at Tel al-Ful north of Jerusalem and Qabatiyah crossroads, south of Janin, allowing IDF units to drive quickly east and seize the crossings over the Jordan, sealing the West Bank and the fate of the Jordanian Army. As with the Egyptians, the Jordanians fought hard from their fortified lines and inflicted heavy casualties whenever the IDF was forced to make a frontal assault against Jordanian positions. However, Jordanian units rarely tried to outflank or otherwise outmaneuver the Israelis, nor would they reorient themselves to meet Israeli maneuvers.

After the destruction of much of the Syrian Air Force on 5 June, Israel mostly ignored Syria to concentrate on Jordan and Egypt. The IAF did fly some airstrikes against Syrian defenses on the Golan in preparation for an eventual ground assault (flying roughly 100 ground-attack sorties against Syria on 6 and 7 June, and 225 sorties against Syria on 8 June).¹⁹ However, not until 9 June, when Egypt and Jordan were soundly defeated, did Israel move against Syria.²⁰ Damascus deployed about 50,000 men with 500 tanks and assault guns, 500 APCs and nearly 300 artillery pieces in heavily-fortified lines in the forbidding defensive terrain of the Golan.²¹ On 9 June, Israel launched about 20,000 troops and 250 tanks in seven tired but confident brigades. One advantage Tel Aviv possessed was that by the time of their attack on the Golan, the IAF was free to participate fully against the Syrians and, despite its busy week, the IAF could still muster over 150 serviceable combat aircraft.²² In virtually identical fashion to the performance of the Egyptian and Jordanian armies, the Syrians fought back hard when the Israelis attacked, but refused to maneuver against them, to concentrate their forces against Israeli penetrations, or to launch anything but small, sporadic frontal counterattacks which the IDF defeated almost effortlessly. As a result, by the end of 9 June, the Israelis had turned the northern flank of the Syrian lines and the next morning they simply began rolling up the Syrian lines from north to south. By mid-afternoon, the battle was over as Israeli forces took the

key town of al-Qunaytarah on the eastern edge of the Golan and the Syrian army fled in disarray.

Was Israeli Air Power Decisive?

Israel's victory during the Six-Day War was defined by Israel's control over the Sinai, West Bank and Golan Heights at war's end. For the IAF to be considered the decisive element of the victory, it would be necessary to prove that it was the IAF that crushed the Arab armies and drove them out of those territories, or else that the IAF effectively enabled the Israeli army to do so – for instance by breaking the morale of the Arab armies such that no real fighting was necessary to defeat them. This was not the case. Important as the contributions of the IAF were, the Six-Day War ultimately was decided on the ground, not in the air. Israel conquered the Sinai, the West Bank and the Golan by smashing the Arab armies entrenched there and, for the most part, it was Israel's army that did so. Israeli air power played an important supporting role, but only a supporting role, in the defeat of the Arab armies.

The most important evidence supporting this argument is that the ground campaigns were effectively decided on 5 and 6 June, and the IAF contributed very little to these battles.²³ For the most part, the IAF did not participate in significant numbers in the Israeli ground campaigns against Egypt and Jordan until 6 June, and did not really bring its full weight to bear in Sinai until 7 June. The campaign against Egypt was decided on 5 and 6 June in the breakthrough battles at al-Ageilah, Umm-Qatef, Qusaymah, Khan Yunis, Rafah and the Jiradi pass, and in the battles against Egypt's operational reserve at B'ir Lafhan and their secondary defense line at Jebel Libni. After that, with the exception of a rearguard action by the remnants of the Egyptian 4th Armored Division at B'ir Gifgafah on 7 June, there were no combat operations by organized, cohesive Egyptian units – just skirmishes between disorganized Egyptian groups trying desperately to escape back to the canal and Israeli forces either blocking their way or pursuing them across the desert. Likewise, the fighting on the West Bank was decided during the breakthrough battles on 5 June, north and south of Jerusalem, at Radar Hill and Latrun on the northern shoulder of the Jerusalem corridor, at Tulkarm and Janin in northern Samaria, and in the defeat of Jordan's 60th Armored Brigade at Tel al-Ful on 6 June. The last element of Jordan's operational reserve – the elite 40th Armored Brigade – was not defeated until 7 June at Qabatiyah crossroads; however, by then, this battle had become something of a sideshow. Thus by the end of the day on 6 June, the contest for the West Bank was also effectively decided (see table 1).

TABLE 1 ISRAELI AIR-TO-GROUND SORTIES BY DAY, BY FRONT, 5–10 JUNE 1967

Front	5 June	6 June	7 June	8 June	9 June	10 June	Totals
Egypt	170	286	321	160	20	8	965
Jordan	95	221	233	0	0	0	549
Syria	3	107	98	225	299	345	1,077
Totals	268	614	652	385	319	353	2,591

Source: History Branch, Israeli Air Force, correspondence with the author, 10 September 1997.

Although the Egyptian and Jordanian armies were effectively defeated on 5 and 6 June, the IAF was mostly focused elsewhere. On 5 June, most of the IAF's day was taken up in its counter-air operations against Egyptian, Syrian, Jordanian and Iraqi airbases. The IAF contributed a relatively small number of airstrikes against Arab ground forces on 5 June, flying only 268 ground-attack sorties on all three fronts (compared to 614 on 6 June and 652 on 7 June). Against Sinai, the Israelis flew only 170 ground-attack sorties on 5 June (compared to 286 on 6 June and 321 on 7 June) and probably destroyed no more than 12–15 Egyptian tanks.²⁴ On 6 June, the IAF was committed more fully to ground support, but Israeli airstrikes on all three fronts started with the Arab forces and infrastructure *farthest* from the frontlines and then slowly worked their way back toward their own advancing ground forces.²⁵ As a result, most of the IAF airstrikes flown against Arab ground forces were actually interdiction sorties directed against logistics and rear-area formations, rather than the frontline units and operational reserves whose defeat were the keys to Israeli victory. For example, the IAF only became a significant factor against the Egyptian combat forces on the Sinai front on 7 June, when Israeli aircraft hammered the masses of Egyptians surging back to the canal. The official IDF report on the war found that nearly all of the Egyptian armored vehicles destroyed by airstrikes were destroyed during the Egyptian retreat – not during the battles in eastern Sinai where the campaign was decided.²⁶ Similarly, on 5 June, of the 95 air-to-ground sorties the Israelis conducted against the West Bank, 42 hit targets in the Jordan valley and only 32 struck targets in the key combat zones around Jerusalem and Janin.²⁷

The Israeli army broke through the entrenched infantry lines of the Arab armies on all three fronts essentially without air support. In the Sinai, the IDF attacked into the most heavily-fortified and well-defended sectors of the front at Khan Yunis/Rafah/the Jiradi pass in the north, and at Abu Ageilah/Umm Qatef/Qusaymah in the center.

Similarly, on the West Bank, the IDF attacked into the most heavily-fortified and well-defended sectors of the Jordanian front at Latrun, Radar Hill, Ammunition Hill and Abu Tor. In every case, they received little or no support from the IAF and yet in every case they punched through the Arab lines quickly (in a matter of hours) and with very few casualties. Even the worst losses the Israelis took in these battles, such as at Ammunition Hill, barely affected the combat power of the Israeli assault forces or their ability to continue to perform their missions. Only on the Golan did the IAF contribute in a meaningful way to the breaching operation by laying on (along with Israeli artillery) a heavy preliminary bombardment of the forward Syrian positions. In this case, the airstrikes had little physical impact on the Syrian forces as the Israeli ordnance generally could not penetrate the stout Syrian bunkers. However, it did serve an important purpose by suppressing Syrian fire while Israeli combat engineers laboriously cleared the extensive Syrian minefields.

The battles against the Arab infantry formations manning the fortified lines on all three fronts were the most important of the war. The Arab armies had very little ability to conduct fluid battles of maneuver. Consequently, Arab armored and mechanized formations were at a severe disadvantage against their Israeli counterparts, resulting in the lopsided Israeli victories against (usually larger and better-equipped) Arab armored forces at Rafah, Abu Ageilah, B'ir Lafhan, B'ir Gifgafah, the Dotan Valley and Tel al-Ful. However, the Arab infantry formations were tough opponents when conducting static defensive operations from fixed positions. Although Israeli units were competent in set-piece offensives, the greatest strength of the IDF – when it displayed its true tactical genius – was in unstructured maneuver battles. Thus, the initial breaching operations pitted the Arab armies at their best against the Israelis at their worst: the IDF was forced to conduct set-piece, frontal assaults against entrenched Arab defenders. If the Arabs were going to beat the Israelis, it was in these battles.

The fact that the Israeli Army prevailed so handily in these attacks, and that the IAF contributed so little to their outcome, makes two points apparent. First, that the Israeli ground forces were so far superior to their Arab counterparts in every aspect of military operations that the war's outcome was probably a foregone conclusion. And second, that this superiority was so great that the contribution of the IAF was not critical to securing an Israeli victory on the ground.

Numerous Arab sources frequently assert that Israeli airstrikes decided particular ground battles. These accounts are almost entirely inaccurate and reflect a tendency among some Arab writers to ascribe

the defeat of their armies to the supernatural powers of the IAF. In nearly every case, the IAF played only a secondary role in these battles, and in a number of cases did not participate at all. For example, even Samir Mutawi, Jordan's most insightful and objective commentator on the war, claims that one reason the Israelis prevailed at Ammunition Hill was because of airstrikes. However, the Israeli accounts, including those of General Uzi Narkiss (the front commander) and Colonel Mordechai 'Motta' Gur (the commander of the 55th Paratroop Brigade, which conducted the attack), point out that there was a major debate among the Israeli commanders over whether to launch the attack at night without air cover or wait until morning when the IAF could participate. Ultimately, Narkiss and Gur decided to launch the attack at night – against the judgment of the Israeli General Staff – and so no IAF aircraft participated in the battle at all.²⁸ There are many other instances of this phenomenon, particularly for battles on 5 June, when the IAF was so busy destroying the various Arab air forces that it conducted only 95 ground-attack sorties against the West Bank, yet Jordanian sources claim their troops, 'were subjected to [air] attack almost every time they moved'.²⁹

The limited role of the IAF in the crucial breakthrough battles against the Arab infantry is reinforced by the experience of the subsequent armor battles in which the IDF defeated the Arab operational reserves. The IAF did not participate in the armor battles against Egypt at Jebel Libni and B'ir Gifgafah, or against Jordan in the Dotan valley. Likewise, Israeli sources make clear that at Tel al-Ful on 6 June, the IDF did not receive any air support despite Jordanian claims to the contrary.³⁰ The Jordanians had every advantage in this battle – equipment, numbers, terrain – but were still defeated. The Jordanians had a battalion of modern M-48 Pattons and a battalion of mechanized infantry in M-113s pitted against a reinforced company of Israeli Super Sherman tanks (old World War II tanks which the Israelis had refurbished and upgraded) and a battalion of mechanized infantry in World War II-vintage M-3 halftracks. The 76-mm guns on the Super Shermans could not even penetrate the frontal armor of the Jordanian Pattons.³¹ Nevertheless, the Israelis still defeated the Jordanian armor handily and drove them off Tel al-Ful and its nearby village while suffering only light casualties.³² The only contribution of Israeli air power to this battle was that the Jordanian armored brigade had been hit by Israeli airstrikes twice the night before. However, these attacks destroyed only two to three tanks and a few other vehicles and only delayed the brigade's advance by a few hours.³³ In addition, any psychological impact from the attacks should have worn off by the time of the battle, as historical experience of ground forces under air attack from World War II to the Persian Gulf War makes clear that the

psychological impact of airstrikes wears off quickly unless applied repeatedly over the course of many days or weeks.³⁴

At B'ir Lafhan on 6 June, where two battalions from General Yoffe's *ugdah* defeated the main Egyptian counterattack by two brigades of the 4th Armored Division, the Israelis did conduct airstrikes during the battle itself, and these no doubt contributed to the defeat of the Egyptian armor, but here as well, the evidence confirms that Israeli ground operations were decisive.³⁵ Of particular relevance is the account of the senior Israeli military officer present at the battle, (then) Colonel Avraham 'Bren' Adan who was Yoffe's chief-of-staff and led the Israeli forces at B'ir Lafhan. Adan has an unrivalled reputation for objectivity and ruthless honesty – even to the extent of criticizing his own conduct. According to Adan, the IDF received only a small number of airstrikes (perhaps a dozen sorties) during the battle, and these destroyed very few Egyptian tanks or APCs, although they did destroy a number of Egyptian trucks. This contention is supported by the findings of the postwar Israeli and US assessments of the war, which found that very few Egyptian tanks had been killed by airstrikes on any front.³⁶ Likewise, other sources confirm Adan's assessment that the battle was won by the two Israeli tank battalions, one of which pinned the two Egyptian brigades while the second caught them in the flank. The two battalions inflicted roughly 30 per cent casualties on the Egyptian armor, causing the rest of the force to flee.³⁷

The most important role of the IAF in the ground battles was probably at Qabatiyah crossroads on 7 June, where an Israeli mechanized infantry brigade and an infantry brigade eventually defeated Jordan's elite 40th Armored Brigade, led by its best field commander, Brigadier Rakan al-Jazi. Even in this battle, Israeli air power played an important role in the outcome of the battle, but its contribution was not decisive. In this battle, the Israelis made two unsuccessful attempts on 6 June to knock the Pattons and M-113s of the Jordanian 40th Armored Brigade off a ridge overlooking the critical Qabatiyah road junction controlling movement south into the West Bank. Both efforts were frontal assaults by a tired and understrength battalion of Israeli Super Shermans without infantry, artillery or air support that were handily beaten back by the Jordanians. The next morning, the Israelis bombarded the ridge for 15–30 minutes with artillery and airstrikes, and then used a combined-arms team of Super-Shermans and mechanized infantry, coupled with leg infantry, to pin the Jordanian forces on the ridge while a second combined-arms team outflanked them. This maneuver forced the Jordanians to try to fall back from the ridge, at which point they were caught and demolished by Israeli armor and aircraft. In this case, IAF airstrikes were important to the Israeli victory, but not as important as the Israeli ground attack.

Vicious though the preparatory aerial bombardment may have been, there is no reason to believe that this would have forced the Jordanians off the ridge alone. It was the fear that the Israeli flanking force was enveloping his brigade that convinced al-Jazi to try to fall back. Absent the airstrikes, al-Jazi might have been bolder and attempted to block the Israeli envelopment – something he had successfully done in the fighting on 6 June. However, by then, the IDF outnumbered him on the ground (two brigades to one), a third Israeli brigade was already in his rear on the Janin-Tubas highway and could easily have been moved north to take his force from behind, and the rest of the Jordanian army was collapsing all around him. Thus the Israeli airstrikes were hardly the decisive factor in forcing al-Jazi to retreat. Instead, he fell back because of the combination of the immediate tactical problem of the Israeli flanking attack and the larger operational problem that his position was untenable even if he solved his tactical problem.³⁸

Israel's command of the air had a heavy impact on the morale of the Arab ground forces, but not until after the decisive ground battles in Sinai and the West Bank had been fought and won by the Israeli army. As noted above, the IAF was generally absent from most of these battles. Nor could the shock of having all of the Arab air forces destroyed in one fell swoop – leaving Israel with air supremacy – have affected the Arab defenders prior to these battles, since nearly all of them occurred *before* the Arab ground commanders were even aware of the impact of the Israeli airstrikes. Specifically, the Egyptian Air Force high command did not even tell President Nasser of the outcome of the strikes until about midday on 5 June, while the army in Sinai, including its commander, General Murtagi, were not told of the results until 1200 hours on 6 June – after all of the breakthrough battles were over and the IDF had defeated the counterattack by the 4th Armored Division at B'ir Lafhan.³⁹ Indeed, several Egyptian generals I interviewed indicated that the persistent query that they and their men had during the war was, 'where is our air force to help us?'. All indicated that it was not until after the war that they learned of the Israeli air raids and the destruction of their air force.⁴⁰ Indeed, in the battles on 5 and 6 June, the Arab units generally fought very hard and showed no indications of demoralization. There were some exceptions to this rule – an Egyptian brigade at Qusaymah that fell apart on first contact and Jordanian forces on Radar Hill who disintegrated even though they were defending terrain so good that the Israelis thought they would be making a suicide charge. However, in the vast majority of cases the Egyptian and Jordanian ground forces showed no signs of demoralization: they fought very hard, just not very well.

The greatest contribution of Israeli air power to the various ground campaigns came during the pursuit phases. Because the IAF concen-

trated first on destroying the Arab air forces and then on disrupting Arab rear areas, the Arab combat forces defending their forward lines suffered least from airstrikes, the operational reserves only slightly worse, while the logistical support units and second-echelon forces suffered the most from air attack. To some extent, only when the Arab combat forces began retreating did they come into the kill zones being worked over by Israeli fighter-bombers. At this point, the IAF began to cause severe damage to Arab forces. Between the demoralization of their defeats at the hands of the Israeli army, and the channeling effect of the terrain in all three theaters, the Arab ground forces were physically and emotionally ripe for destruction by air when they began their retreats. Consequently, Israeli airstrikes against Egyptian and Jordanian forces beginning late on 6 June and Syrian forces early on 10 June had an ever greater impact, destroying vehicles, delaying and dispersing Arab formations to ease their destruction by Israeli ground forces, and causing huge numbers of Arab personnel to simply abandon their equipment and run. Nevertheless, by this point, the war had been decided, and all that remained was to determine the final score.

How Many Tanks did the IAF Destroy?

The IAF's primary impact on the decisive ground campaigns of the Six-Day War was psychological, not physical. All available evidence indicates that Israeli airstrikes caused little physical damage to Arab combat forces during the Six-Day War. Indeed, the official US survey team sent to Israel after the war to collect data for US planners concluded that the role of the IAF in the Israeli victory had been greatly exaggerated. After examining in minute detail a sample of 30–40 per cent of all tanks (Israeli and all Arab armies) destroyed in the fighting, they concluded that airstrikes had been only a minor cause of damage to armor.⁴¹ They found that the 20- and 30-mm cannons which were the primary ground attack weapon on Israeli aircraft did 'uniformly slight damage' to Arab tanks. Indeed, only eight per cent of the Arab tanks were even hit by aerial munitions of any kind, and only 2–3 per cent of the Arab tanks were actually destroyed by these hits. The survey team concluded that, 'This type of data tends to refute the contention that the Israeli Air Force was directly responsible for the damage to the majority of the Arab tanks and shows conclusively that ground weapons were, in fact, responsible for practically all damage to tanks under the strategical [sic], tactical, terrain, and weather conditions of the June 1967 war'.⁴²

Even the official Israeli survey – which was far more favorable to the IAF than the later US report – concluded that only 15 per cent of Egyptian tank losses could be attributed to IAF airstrikes. The Israeli

damage assessment teams that canvassed the battlefields in Sinai assessed that, at most, the IAF knocked out 75–90 Egyptian tanks and self-propelled guns during the entire course of the war. The survey also revealed that Israeli pilot claims regarding destroyed Egyptian armored vehicles were three or four times higher than the actual number of kills.⁴³ Moreover, anecdotal accounts of Israeli airstrikes, the assessments of Western personnel who toured Sinai after the war, and the recollection of Israeli ground officers, all fully concur with the conclusions drawn by the American and Israeli studies that the IAF had had comparatively little impact on Arab combat formations.⁴⁴

Although the IAF did little damage to the ‘teeth’ of the Arab armies, it did considerably more damage to their ‘tails’. Israeli fighter-bombers took a far greater toll of Arab trucks and other thin-skinned vehicles such as jeeps and cars (and even a few military trains) than armored fighting vehicles. Because Israeli interdiction operations began at the very rear of the Arab defensive zones and then worked their way forward, most of the IAF airstrikes flown against ground forces were actually directed against logistics and rear-area formations. Israeli pilot reports from Sinai claimed to have destroyed more than twice as many unarmored vehicles than tanks and self-propelled guns.⁴⁵ Again, anecdotal reporting of IAF strikes, as well as the accounts of IDF participants and Western observers, corroborate the statistical conclusions that Israeli aircraft did more damage to Arab trucks, jeeps and cars than to tanks and APCs. When Tel Aviv’s fighter-bombers did attack Arab maneuver units, most of the damage they did was to the organic logistical elements of the unit, rather than to the combat formations themselves. However, because the IAF initially concentrated on ground targets in the Arab rear areas, most of the thin-skinned vehicles that the Arabs lost to airstrikes in the early days of the war were part of supply and transport companies attached to higher level formations and not to the frontline units. As a final note, the IAF claimed to have destroyed 783 trucks and other unarmored vehicles in Sinai. This is not very many given that the Egyptian Army in Sinai possessed well over 10,000 such vehicles.⁴⁶ Again, this strongly indicates that the physical damage from Israeli airstrikes was limited, and much less than suggested by many of the Arab, or even some of the more bombastic Israeli, accounts.

Overall, this pattern of damage wrought by the IAF supports the claim that the IAF was an important secondary factor, but not the decisive element in the defeat of the Arab armies. First, the IAF flew relatively few missions against Arab combat forces, and in these attacks killed and damaged very few armored vehicles. Thus there was little attrition of forward Arab combat power from airstrikes. Second, the

IAF did considerably more damage to the logistical trains of the Arab armies, but the war did not last long enough for this to have had a real impact. In particular, because nearly all of the key battles of the war took place within the first 24 hours, Arab combat forces did not really have the opportunity to run out of fuel, ammunition, food and so on. There is no evidence – even anecdotal – from either the Israeli or Arab side that Arab units were hampered in combat during the first two days of the war because of logistics shortfalls. (Whereas the Israelis almost always seemed to be short of fuel and ammunition.) Thus the destruction of their logistical units was essentially irrelevant to the conduct of the war by the Arab armies. Had the war gone on for even a few days longer, the Arab armies would no doubt have begun to suffer from the damage to their logistical trains, but since the Israeli ground forces finished the job so quickly, this potential encumbrance was never realized.

The Impact of Israeli Air Power

Having discussed what the IAF did not do, it is important to turn now to what the IAF did do. Although the impact of the Israeli air effort was not at all what the legends about the war claim – that it was the decisive factor in Israeli victory and that it did so by killing lots of Arab tanks – the IAF's contribution was still very significant. Indeed, by clearing away these myths, it helps us to develop a better understanding of how air forces affect ground operations. In particular, what stands out regarding the impact of Israeli air power was its powerful psychological effects, which dwarfed the physical damage it inflicted on the Arab armies. The IAF made its presence felt primarily by sowing confusion and panic in the Arab armies, causing paralysis, demoralization and then a near-total breakdown in unit cohesion as they fled.

Turning Retreat into Rout

To a great extent, it was the constant, relentless Israeli air pressure on 7 and 8 June that turned the Egyptian and Jordanian retreats into routs. Many Arab units were badly disrupted by Israeli airstrikes that caused soldiers to scatter (with or without their vehicles), inflicted casualties and gave the survivors a serious scare. Indeed, the widespread exaggeration of the number and lethality of Israeli airstrikes among Arab accounts is, at least to some extent, attributable to the deep impression they left on Arab personnel. Although analyses of the psychological impact of airstrikes are few, those available, and numerous anecdotal accounts from every conflict since World War I, make clear that an airstrike can be a terrifying experience for ground

troops, especially those with little warning or ability to fight back, as was true for all of the Arab armies in 1967.⁴⁷ In a number of cases during the Six-Day War, although Israeli airstrikes caused only minor damage to an Arab unit, they caused so many personnel to abandon their vehicles or lose their nerve that the unit was essentially incapable of further action. Arab units generally decided that retreat was the better part of valor after suffering through Israeli airstrikes not because of the physical damage they had sustained, but because of their fear of future attacks. For instance, the Jordanian 2nd Armored Regiment (battalion) of the 60th Armored Brigade was moving to try to bolster the crumbling defenses of Jerusalem during the night of 6/7 June when it was caught by the IAF and subjected to severe airstrikes.⁴⁸ Although the Jordanians lost few tanks or APCs in the raid, the unit was so thoroughly demoralized that it retreated back to the Allenby bridge rather than press on and risk further airstrikes.⁴⁹

Isolating the Battlefield

In addition to its impact on the Egyptian and Jordanian retreats, Israeli air power also had a meaningful impact on the course of the war by preventing Arab reserves from participating in the battle. This was particularly important in the battle for the West Bank, but may also have played a role in the conquest of the Golan. Israeli airstrikes against Arab reserves moving forward to reinforce the frontlines invariably delayed, halted and occasionally either scattered or routed these units. Against Jordan, Israeli airstrikes prevented elements of the 27th Infantry Brigade, the 2nd Armored Regiment (battalion) of the 60th Armored Brigade, and the entire 6th Infantry Brigade from reaching Jerusalem in time to contribute to the defense of the city.⁵⁰ Likewise, IAF raids against the Iraqi 8th Motorized Brigade so paralyzed the unit, that it never even made it to Amman. Against Syria, there is no specific evidence that IAF airstrikes prevented particular Syrian reserves from joining the fray. However, it seems likely that the IAF did prevent the main Syrian operational reserve – the 42nd Brigade Group, which Tel Aviv was watching very carefully – from moving to the front because of air interdiction. Indeed, the Syrian high command may have pulled this formation back to Damascus during the night of 9/10 June as much to shelter it from further pounding by the IAF as to protect the capital (and the regime) from an Israeli ground attack.⁵¹

Paralyzing the Arab High Commands

The psychological blows inflicted by Israeli air power on the Arab armies not only hit the combat units at the bottom of the chain of

command, but also struck at the generals at the very top of the hierarchies. The destruction of the Egyptian Air Force shocked Egypt's political-military leadership.⁵² Nasser; Field Marshal 'Amr, the Commander-in-Chief of the Armed Forces; Defense Minister Shams Badran; Air Force Commander Sidqi Mahmud; and much of Cairo's General Staff, had never expected such a devastating attack, nor thought that they would be deprived of their air force at the start of a war with Israel. In his memoirs, Anwar as-Sadat described Marshal 'Amr's reaction on the morning of the attack:

I went into Amer's office to find him standing in the middle of the room, looking about with wandering eyes. 'Good morning,' I said, but he didn't seem to hear me. I said 'Good morning' again, but it took him a minute to return my greeting. I immediately realized something had gone wrong. I spoke to those present and was told that our air force had been completely destroyed on the ground.⁵³

It would be reasonable to expect any group of commanders to have been shocked by this sudden catastrophe; however, in many ways, this was a mercurial bunch, and their reaction may have been even more extreme. 'Amr became catatonic, Nasser panicked and attempted to convince King Hussein to blame the Americans, and few others in Cairo seem to have been able to think straight for the first hours of the war.⁵⁴ In the words of Field Marshal Gamasy (then Chief-of-Staff to the Egyptian Eastern Command controlling all forces in Sinai), 'In the face of this disastrous situation, the general command and the air force command went into a state of paralysis and were unable to think or plan a response'.⁵⁵

All of the Arab armies had extremely rigid and centralized command and control systems, and with their highest echelons overcome by shock, they had difficulty responding to the Israeli onslaught. Although the unwillingness of Egyptian division and brigade commanders in Sinai to take the initiative and act on their own greatly contributed to Egypt's problems, it is still the case that much of the general inertia afflicting Egyptian forces can be traced to the shock and panic that gripped the highest echelons of the Egyptian command as a result of the sudden destruction of their air force. The Israeli ground offensive into Sinai was conducted with such speed and power that the Egyptians had to react very quickly to every IDF move, but the high command was in no shape to make rapid, effective decisions. As a result, little guidance came from Cairo in the crucial early hours of the war. Many Egyptian units sat in place, not even acting to implement their well-defined missions to counterattack or reinforce specific sectors without explicit orders from the high command to do so.⁵⁶ The Jordanians were equally

stunned to learn that the most powerful air force in the Arab world had been reduced to ashes in a few hours. According to Mutawi, Amman's realization on 6 June that the Egyptian air force had been destroyed, 'had a devastating effect on the Jordanian command', and was one of the reasons the king and his senior military commanders decided to abandon the West Bank.⁵⁷ Although the Jordanians reacted better than the Egyptians in terms of moving reserves and launching counter-attacks, it was still the case that Jordanian reactions were rarely in time to stop the flexible, quick-moving Israelis. Given how decisively the Israelis prevailed in every tactical engagement – whether it was a frontal assault against dug-in Arab defenders, or a meeting engagement with Arab armor – there is no reason to believe that if the Egyptian and Jordanian high commands had been able to react more quickly and order the counterattacks, their subordinates would not undertake on their own that this would have changed the ultimate outcome. But again, it would have changed the course of the fighting and might have bought them some more time to conduct a more orderly withdrawal.

The Importance of Israeli Air Supremacy

Arguably the most important accomplishment of the IAF was its near perfect counter-air effort. The IAF removed the Arab air forces almost completely from the military balance. As a result, Israeli ground forces were able to move and fight with almost no interference from enemy aircraft. Although Israeli ground forces were so much more competent than their Arab counterparts – and in the limited operations they were able to conduct, the Arab air forces revealed themselves to be mostly hapless – that the Israelis likely would have prevailed even if they had had to contend with Arab air interference, the war would have looked very different. Even inaccurate airstrikes that cause little damage can be disruptive of ground operations, costing time as the ground forces must disperse and then regroup after each attack. If Israeli ground forces had had to fend off Arab airstrikes they almost certainly would have moved more slowly than had been the case. Likewise, a few well-timed air attacks (even ineffective ones) could have broken up key Israeli assaults such as those on the fortified Arab positions at Abu Ageilah, Rafah, the Jiradi pass, Radar Hill, Ammunition Hill and the northern Golan. Arab airstrikes might also have impeded the IDF's logistical operations. Many Israeli armored units did run out of fuel or ammunition at different points during the course of the fighting, and these problems could only have been worse had Israeli supply columns been subjected to Arab airstrikes. Even a near miss from a 500-lb bomb can destroy a fuel or ammunition truck, and even inaccurate airstrikes can badly slow a column of thin-skinned trucks with little ability to move off-road.

Furthermore, if the IAF had had to spend its time contesting air superiority with Arab fighters rather than striking Arab army units, the various Arab retreats would have looked very different. The constant Israeli airstrikes served as a lash, driving on the Arab armies, stoking their panic and impressing on them a constant need for haste. Absent the airstrikes, the Arabs might have been able to conduct a more orderly retreat, perhaps established and scouted routes of march, deployed more rearguards, and better coordinated and prioritized the movement of units out of the theaters of war. Less Arab equipment would have been destroyed, either directly by air-delivered ordnance, or indirectly as drivers and crews wrecked equipment in their haste to flee Israeli fighter-bombers. Similarly, far less equipment would have been abandoned by crews panicked by airstrikes.

Reassessing the Role of Air Power in Israel's Victory

Overall, the IAF played a major role in the conquest of the Sinai, West Bank and Golan Heights, but was not the decisive element in the defeat of the Egyptian, Jordanian and Syrian armies. Israeli air power eliminated the Arab air forces, and so allowed the Israeli ground forces to conduct operations without fear of air attack. Israeli air power also mauled Arab units as they retreated from the frontlines, causing a fair number of the casualties the Arabs suffered in the Six-Day War. Finally, Israeli air power was an important element in preventing the Arab armies, particularly the Jordanians, from reinforcing their forward defense lines. However, the inability of entrenched Arab units – often deployed in superb defensive terrain – to hold off equal or smaller-sized Israeli units, combined with the inability of larger and usually better-armed Arab armored forces to beat Israeli armored units in maneuver battles, ultimately were the crucial factors in Israel's victory. In these contests, the IAF essentially played only a supporting role. The carnage wrought by Israeli air power during the pursuit phases of the various campaigns contributed to the strategic outcome of the war by ensuring that the Arabs would escape with little of their military power intact, but essentially was irrelevant to the defeat of the Arab armies and the Israeli conquest of Sinai, the West Bank and the Golan.

Had the IAF not been able to participate in the campaigns against Egypt, Jordan and Syria, Israeli casualties would undoubtedly have been higher and it would have taken Israel longer to secure its conquests, but the Israelis still would have won, and probably quite handily. The tactical performance of all three Arab armies was sufficiently poor that there is little reason to believe they could have held back the Israelis even without IAF participation. At Abu Ageilah,

Khan Yunis, Rafah, Jebel Libni, Latrun, Radar Hill, throughout Jerusalem and across the Golan, Arab combat units were only capable of fighting from their fixed defenses, and once the course of battle changed, they were incapable of adapting. Arab units in every theater rarely counterattacked, mostly would not redeploy or reform their lines to meet Israeli flanking operations, and generally would not maneuver in battle against Israeli tactical formations. Thus, as soon as the Israelis had penetrated the Arab infantry lines, the fight was effectively over because the Arabs would not shift their forces or counterattack to prevent the Israelis from clearing their positions.⁵⁸ Indeed, in his memoirs, General Narkiss notes that the Israeli 10th Mechanized Brigade's attack up the ridge of the Jerusalem corridor should have been suicidal, but because Jordanian resistance was so incompetent, it turned into a rout.⁵⁹

Arab mechanized formations did little better than the infantry: Egyptian, Jordanian and Syrian armored reserves were butchered by Israeli armor at Rafah, Abu Ageilah, B'ir Lafhan, Jebel Libni, B'ir Gifgafah, the Dotan valley, Tel al-Ful, the Janin-Tubas road and on the Golan. In many of these cases, the Arab units not only outnumbered the Israelis, but also outgunned them. Thus at Tel al-Ful, the M-48 battalion of the Jordanian 60th Armored Brigade was easily defeated by a smaller force of Israeli Super Shermans with 76-mm guns (not even 105-mm guns). Indeed, the only Arab armored formation that even held its ground against the Israelis was the Jordanian 40th Armored Brigade under the command of the exceptional Rakan al-Jazi.

Given these problems, it is difficult to believe that the absence of the IAF would have somehow completely transformed the situation. There were several instances where IAF intervention had a major *and direct* impact on the course of operations on the ground, but in each of these cases, had the IAF not intervened, there is no reason to believe the Israelis would not still have won the war – just not as quickly or easily. In particular, the IAF interdicted many Jordanian attempts to reinforce Jerusalem, preventing elements of the 60th Armored Brigade and 27th Infantry Brigade, and the entire 6th Infantry Brigade, from reaching the city on 6 June. However, had those units been able to reach the city there is nothing to suggest they would have dramatically altered the outcome of the fighting. Even if they had been able to arrive around midday on 6 June (probably the earliest possible given their start times), Jebel Mukhaber, Radar Hill, Abu Tor, Tel al-Ful and Ammunition Hill/Shaykh Jarrah all would have fallen already, the Old City would still have been isolated on three sides and the Jordanian defense of Jerusalem would already have been undermined. Nor is there reason to believe that these units would have fought better than the Jordanian forces that actually were there, and thus been able to counterattack,

drive back the Israelis and reform a coherent defense of East Jerusalem. Obviously, the additional forces would have delayed Israel's advance, if only because it might have taken the IDF a day or more to destroy them, but this probably would not have made much difference in the end. Israel consistently rejected UN and superpower pressure for a ceasefire, suggesting that an extra day or two to complete the conquest of the West Bank would not have radically altered the outcome of the war. Similarly, if the Israelis had not been able to conduct airstrikes against Qabatiyah crossroads on the morning of 7 June, the Jordanian 40th Armored Brigade might have been able either to hold its position on the ridgeline or else fall back to another position farther south. However, this almost certainly would still have proven irrelevant: one capable Jordanian brigade was not going to stop the Israeli conquest of the West Bank.

Lessons for the Employment of Air Power from the Six-Day War

It is unfortunate that air power enthusiasts continue to obsess over the need to prove that air power can be a decisive instrument of war, and mischaracterize historical events to try to catch this will-o'-the-wisp. There is no longer any substantive reason to do so. The US Air Force is well established as an independent service. Over time, it is gaining an equal share of the most senior command billets (particularly as commanders-in-chief of the Unified and Specified Commands). The Congress and the services all appear content with the longstanding division of the budgetary pie and any changes are likely to be marginal. Nor is proving or disproving this theory ever likely to affect war-fighting strategies: the US military is not going to try to win a war using just one service when it can employ two, three or all four. It will employ whatever forces are necessary to do the job. Kosovo made this clear: the US started with air power and had that failed, Washington was already prepared to move on to a ground campaign. Falsely claiming that the Six-Day War proved that air power could be decisive was not going to affect a presidential decision about whether to use ground forces if air power could not bring the Serbian regime to heel, nor will it at any time in the future. However, by distorting the history of the Six-Day War, air power enthusiasts have muddled important lessons about the impact of air forces on ground operations.

The Six-Day War highlighted four key effects of air power on land warfare.

First, air forces can create severe temporary panic and delays, disrupting and demoralizing tactical forces and leaving them highly vulnerable to ground attack. This effect has tremendous immediate influence, rendering enemy ground forces vulnerable to a friendly

ground assault, but fades quickly as the psychological trauma of the air attack wears off.

Second, because of the ability of air forces to concentrate for massed operations, air power can deliver stunning psychological blows to the enemy's chain of command as a whole. The key here is to find an appropriate target – one which is both vulnerable to a short, violent air campaign, and important enough so that its destruction or incapacitation will cause widespread shock. By the same token, like the psychological dislocation of tactical forces, this kind of impact is likely to wear off quickly as the enemy recovers from the initial trauma.

Third, air forces can shut down supply flows and destroy the logistical stores carried by combat forces. Over time, this will first hinder the operational movement of motorized and mechanized forces, then the fighting power of enemy maneuver units (as ammunition and fuel is depleted) and finally their morale.

Fourth, air forces can prevent operational and theater reserves from reaching the front in time and in shape to immediately execute combat operations. In some extreme cases, air power may be able to prevent entire units from reaching the front, or even cause them to retreat, by itself.

The Six-Day War also illustrated the difficulty of a fifth effect, namely the ability of air forces to directly defeat enemy ground forces by physically destroying, or rendering 'combat ineffective', entire enemy maneuver units. This is, perhaps, the most obvious lesson of the Israeli use of air power against the Arabs in 1967: the primary effects of airstrikes are psychological, not physical.⁶⁰ As the IAF demonstrated despite its own exaggerated claims, air power works its influence on ground forces principally out of its shock effect and the panic it creates. Physical damage from an airstrike may be modest, but its psychological impact will often exceed its physical impact by orders of magnitude. Historically, airstrikes have prevented far more of an enemy's combat power from engaging friendly ground forces by demoralizing them and convincing them to retreat or abandon their weapons and flee, than by actually killing men and weapons themselves. Air power typically has caused far greater paralysis in the enemy's chain of command by creating the impression of omnipresent fighter-bombers preventing all movement, than by actually destroying physical lines of communication or command nodes.⁶¹

Consequently, the Six-Day War experience suggests that attriting the combat power of frontline ground forces is one of the least productive missions for an air force. As the Israelis found, airstrikes are an inefficient way to kill tanks, APCs and other major weapons systems. Throughout the twentieth century it was generally the case that, to the extent ground forces were affected by airstrikes, it was usually a result

of crews freezing up or abandoning their vehicles rather than actual damage, and this effect often did not last because crews eventually calmed down and returned to their vehicles when given the time to recover and the opportunity to do so. On the other hand, airstrikes can cause considerable damage to the unarmored vehicles that form the logistical tail of modern armies. Because trucks lack the armor of tanks and APCs, aircraft can inflict considerable direct damage to supply and transport companies. Moreover, because trucks also lack the off-road movement capability of tracked vehicles, airstrikes can cause an equal or greater amount of damage from accidents and breakdowns as drivers attempt to get off the road and disperse while under attack.

Today, we are witnessing the introduction of a wide range of new air-delivered munitions that promise to solve all of these problems. New 'smart' and 'brilliant' weapons such as the Joint Stand-Off Weapon (JSOW), the CBU-97/BLU-108 Sensor-Fuzed Weapon (SFW or 'Skeet'), the Brilliant Anti-Tank weapon (BAT), JDAMs and the Joint Air-to-Surface Stand-off Missile (JASSM), may greatly increase the ability of aircraft to quickly destroy enemy armored fighting vehicles.⁶² However, there is precedent for skepticism. History offers numerous lessons suggesting that these new systems will take time to live up to their promise, and may never achieve a true revolution in targeting. We have repeatedly seen the claims of wondrous new technology undermined by the simple conundrums of war: atmospheric conditions, terrain masking, improved enemy air defenses, limited information and/or the ubiquitous fog of war could all confound the new wonder weapons as they have previous technologies. In the Persian Gulf War, smart munitions proved to be far more accurate than traditional 'dumb' bombs, but far less accurate than originally claimed.⁶³ In that conflict, US forces using earlier generation smart weapons achieved an AFV-kill-per-sortie rate of about 0.039, which is *lower* than historical norms.⁶⁴ Even in Kosovo in 1999, when some of these new weapons were available, NATO's 78-day air campaign only achieved an AFV-kill-per-sortie rate of 0.07, still slightly *lower* than the historical average, albeit nearly twice the rate of the Gulf War.⁶⁵ In fact, Allied military leaders were somewhat embarrassed by how many Serbian tanks and APCs survived the NATO air campaign.⁶⁶ Initial reports from both Operations 'Enduring Freedom' and 'Iraqi Freedom' suggest that American strikes employing this new class of weaponry are proving to be far more accurate than in the past, but as of this writing we do not yet have reliable evidence to make a judgment one way or the other.

This is not to suggest that the US should give up trying to improve the ability of aircraft to destroy enemy AFVs, only that we should be prepared for our accomplishments to be modest. If this is the case, the lessons of the Six-Day War argue that the US would do well to focus its

air operations in ground warfare on delaying, demoralizing and disrupting enemy ground formations, rather than trying to destroy them outright. Perhaps the most compelling lesson of the Six-Day War is that air power can have a psychological impact on ground forces far greater than any physical damage, and physical damage to armored fighting vehicles is inherently difficult to achieve – points confirmed by our Gulf War and Kosovo experiences, and hinted at by the preliminary accounts from the invasions of Afghanistan and Iraq. Ultimately, therefore, our first objective should be working to harness the ability of air power to render enemy ground forces vulnerable to friendly ground forces, rather than having air power try to do it all alone. It is a lesson that has been proven time and again, but it is worth repeating regularly: air and ground forces working together create a combination far more deadly than either operating independently. Thus, the real lesson of Israel's stunning victory in 1967 is the exact opposite of what most of the world learned.

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NOTES

- 1 Donald Neff, *Warriors for Jerusalem* (NY: Linden Press 1984) p.246. See also, Brig. Syed Ali El-Edroos, *The Hashemite Arab Army, 1908–1979* (Amman, Jordan: The Publishing Committee 1980) p.269; James Lunt, *Hussein of Jordan* (London: Macmillan 1989) pp.99–100; Samir Mutawi, *Jordan in the 1967 War* (Cambridge: Cambridge University Press 1987) pp.128, 142.
- 2 Emanuel Wald, *The Wald Report: The Decline of Israeli National Security Since 1967* (Boulder, CO: Westview 1992) pp.88–91, 94–7, 107–10. See also, Anthony H. Cordesman and Abraham R. Wagner, *The Lessons of Modern War: Volume I, The Arab-Israeli Conflicts, 1973–1989* (Boulder, CO: Westview 1990) pp.52–64; Ariel Sharon with David Chanoff, *Warrior: The Autobiography of Ariel Sharon* (NY: Simon and Schuster 1989) pp.303–305.
- 3 For a recent example, see Lt. Col. David K. Edmonds, USAF, 'In Search of High Ground: The Airpower Trinity and the Decisive Potential of Airpower', *Airpower Journal* XII/1 (Spring 1998) p.13. Air Force historian Richard Hallion has written that the Six-Day War was the first that 'came close to being a decisive victory for air power alone'. Richard Hallion, *Storm Over Iraq: Air Power and the Gulf War* (Washington, DC: Smithsonian 1992) p.2.
- 4 Author's interview with General Uzi Narkiss, Sept. 1996. Narkiss was the commander of Israel's Central Command during the war, the front responsible for conquering the West Bank from Jordan.

- 5 The American-led invasion of Iraq relied far more heavily on ground forces for much of the fighting. Indeed, US ground operations were unquestionably the decisive element of the campaign. Consequently, those who argue that air power can be decisive in its own right have generally not employed it as evidence to support this claim.
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- 9 Cohen, *Israel's Best Defense* (note 8) pp. 193–217; Dupuy (note 8) pp.245–7; Hammel (note 8) pp.165–71; Herzog, *The Arab-Israeli Wars* (note 8) pp.151–3; Samuel M. Katz, *Soldier Spies: Israeli Military Intelligence* (Novato, CA: Presidio 1992) p.191; Neff (note 1) pp.32, 202–203; Nordeen (note 8) p.67; Nordeen and Nicole (note 8) p.212; Yonay (note 8) pp.202–13, 231–44; author's interviews with senior IAF officers, Sept. 1996.
- 10 Cohen, *Israel's Best Defense* (note 8) pp.220–221; Dupuy (note 8) p.247; Hammel (note 8) p.392.
- 11 Cohen, *Israel's Best Defense* (note 8) pp.218–20; Dupuy (note 8) p.247; Hussein of Jordan, *My 'War' with Israel*, as told to and with additional material by Vick Vance and Pierre Lauer, trans. by June P. Wilson and Walter B. Michaels (NY: William Morrow and Co. 1969) pp.66–7; Nordeen (note 8) p.67; O'Ballance, *The Third Arab-Israeli War* (note 8) p.70; Yonay (note 8) pp.250–53.
- 12 Nordeen (note 8) pp.77–82, 148.
- 13 For good accounts of the Israeli offensive against Egypt in Sinai, see Randolph S. Churchill and Winston S. Churchill, *The Six Day War* (London: Heinemann 1967); Moshe Dayan, *Diary of the Sinai Campaign* (NY: Harper and Row 1965); Dupuy (note 8); Abdel Magid Farid, *Nasser: The Final Years* (Reading, UK: Ithaca Press 1994); Field Marshal Abdel Ghani el-Gamasy, *The October War: Memoirs of Field Marshal El-Gamasy of Egypt* trans. by Gillian Potter, Nadra Marcos and Rosette Frances (Cairo: American University in Cairo Press 1993); George Gawrych, 'The Egyptian Military Defeat of 1967', *Journal of Contemporary History* 26 (1991); George W. Gawrych, *Key to the Sinai: The Battles for Abu Ageilah in the 1956 and 1967 Arab-Israeli Wars* (Fort Leavenworth, KS: US Army CGSC 1989); Hammel (note 8); Herzog (note 8); Israel Ministry of Defense, *The Six-Day War* (Israel :Israel Press 1967); Samuel M. Katz, *Fire and Steel: Israel's 7th Armored Brigade* (NY: Pocket Books 1996); S.L.A. Marshall, *Swift Sword: The Historical Record of Israel's Victory, June 1967* ([town of publication and US state code?] US: American Heritage Publishing Co. 1967); Nordeen and Nicole (note 8); Wald (note 2); Sharon (note 2); Shabtai Teveth, *The Tanks of Tammuz* (NY: Viking Press 1968); Various authors, in Avrahaim Shapira (ed), *The Seventh Day: Soldiers Talk About the Six-Day War* (London: Andre Deutsch 1970).
- 14 Gawrych, 'The Egyptian Military Defeat of 1967' (note 13) p.279; Hammel (note 8) pp.44, 145; Herzog, *The Arab-Israeli Wars* (note 8) p.152; Israel MoD (note 13) p.52; Neff, *Warriors for Jerusalem* (note 1) p.193; Nordeen and Nicole (note 8) pp.193, 199–200; O'Ballance (note 8) p.99.
- 15 Dupuy (note 8) pp.242–4; Hammel (note 8) pp.149–61; Wald (note 2) pp.82–3.
- 16 For good accounts of the Israeli campaign against Jordan on the West Bank, see Churchill and Churchill (note 13); Dupuy (note 8); El-Edroos (note 1); Lt. Gen. Mordechai Gur, *The Battle for Jerusalem* (NY: Popular Library 1974); Hammel (note 8); Herzog (note 8); Lunt, *Hussein of Jordan* (note 1); Israel MoD (note 13); Robert J. Moskin, *Among Lions: The Definitive Account of the 1967 Battle for Jerusalem* (NY: Arbor House 1982); Mutawi, *Jordan in the 1967 War* (note 1); Lt. Gen. Uzi Narkiss, *The Liberation of Jerusalem* (London: Valentine Mitchell 1983); Neff (note 1); O'Ballance (note 8); Abraham Rabinovich, *The Battle for Jerusalem* (Philadelphia, PA: The Jewish Publication Society 1987); Wald (note 2); Brig. Peter Young, *The Israeli Campaign, 1967* (London: William Kimber 1967).
- 17 El-Edroos (note 1) pp.353–5; 373–83; Hammel (note 8) pp.149–50; 284–7; Young (note 16) p.51.
- 18 Dupuy (note 8) pp.284–5; El-Edroos (note 1) pp.353–5; Narkiss (note 16) p.87; O'Ballance (note 8) p.223.
- 19 History Branch, Israeli Air Force, correspondence with the author, 10 Sept. 1997.

- 20 For good accounts of the Israeli offensive against the Syrians on the Golan, see Churchill and Churchill (note 13); Dupuy (note 8); Hammel (note 8); Herzog (note 8); Israel MoD (note 13); Neff (note 1); O'Ballance (note 8); Patrick Seale, *Asad of Syria* (London: I.B. Tauris and Co. 1988); Wald (note 2).
- 21 Dupuy (note 8) pp.318–9; Hammel (note 8) pp.388–9; Herzog (note 8) p.186; J.M. Moreaux, 'The Syrian Army', *Defence Update* 79 (July 1986) p.38; Seale (note 20) p.117.
- 22 Dupuy (note 8) p.319; Hammel (note 8) pp.394–5; Nordeen (note 8) pp.83–4; author's interviews with senior IAF officers, Sept. 1996.
- 23 The campaign against Syria really did not begin until 9 June; however, having crushed the much larger Egyptian armed forces and the much better-trained Jordanian armed forces in just three days, Israel's ability to defeat Syria thereafter was never really in doubt. The Israelis were very confident, and the Syrians began the war demoralized. Consequently, the decisive campaigns were those against Egypt and Jordan.
- 24 History Branch, Israeli Air Force, correspondence with the author, 10 Sept. 1997; Historical Evaluation and Research Organization, *A Historical Analysis of the Effectiveness of Tactical Air Operations Against, and in Support of Armored Forces*, hereafter referred to as HERO, (McLean, Va: NOVA Publications 1980) p.36.
- 25 Author's interview with Lt. Gen. Mordechai Hod, IAF (Ret.), Sept. 1996.
- 26 HERO (note 24) p.89.
- 27 History Branch, Israeli Air Force, correspondence with the author, 10 Sept. 1997.
- 28 Compare Mutawi (note 1) p.133 with Gur (note 16) pp.56, 60–155; and Narkiss (note 16) pp.158–9, 164. Elsewhere, Mutawi argues that 'Most Arab and Western commentators believe that Israeli air supremacy was the most important military factor which led to the defeat of the Arabs' (Mutawi [note 1], p.128). In the footnote to this statement, Mutawi cites two Arab authors and two Western authors, and one of the authors – Col. Trevor Dupuy – makes no such claim on the pages cited by Mutawi, or anywhere else in his book. (The pages in question are Dupuy [note 8] pp.246–7.) The other source cited is the Churchills' book *The Six-Day War* (note 13) which does claim that Israeli air supremacy was vital to Israel's victory over Jordan. However, the Churchills also note that Israeli airstrikes 'were not particularly effective against the Jordanian armour', and helped mainly by interdicting Jordanian movements through the hills of the West Bank (Churchill and Churchill [note 13] pp.144–6.) It is also worth noting that the Churchills' book is among the least reliable accounts of the fighting and is prone to considerable exaggerations.
- 29 Lunt (note 1) pp.99–100.
- 30 Dupuy (note 8) p.299; Hammel (note 8) pp.315–20, 335–6; Herzog (note 8) p.176; Moskin (note 16) pp.289–90; Narkiss (note 16) pp.192–3, 200, 211–13; O'Ballance (note 8) pp.192–3; author's interviews with senior IDF officers, Sept. 1996. For a Jordanian source claiming air power decided this battle, see El-Edroos (note 1) pp.379–80.
- 31 For confirmation that neither the 75-mm high velocity gun on the Israeli M-51 nor the 76-mm gun on most of the Israeli Super Shermans could effectively penetrate the frontal armor of the Jordanian Pattons, see Joint Technical Coordinating Group for Munitions Effectiveness [JTCGME], *Special Report: Survey of Combat Damage to Tanks*, 3 Volumes (Washington, DC: Defense Intelligence Agency, 1 Nov. 1970) pp.105–21. Some Israeli Super Shermans mounted a French 105-mm gun, but none of these were at Tel al-Ful.
- 32 Dupuy (note 8) p.299; Hammel (note 8) pp.315–20, 335–6; Herzog (note 8) p.176; Moskin (note 16) pp.289–90; Narkiss (note 16) pp.192–3, 200, 211–13; O'Ballance (note 8) pp.192–3; author's interview with Lt. Gen. Uzi Narkiss, IDF (Ret.), Sept. 1996.
- 33 O'Ballance, *The Third Arab-Israeli War* (note 8) pp.182–3, 190, 220.

- 34 S.L.A. Marshall has observed that the psychological impact of airstrikes tends to fade within ten minutes of the attack unless repeatedly reinforced. S.L.A Marshall, 'The Devil and the Sea', in Donald Robinson (ed.), *Under Fire: Israel's 20-Year Struggle for Survival* (NY: W.W. Norton and Co. 1968) p.148. For similar conclusions regarding the duration of psychological trauma from airstrikes, see Ian Gooderson, 'Allied Fighter-Bombers Versus German Armour in North-West Europe 1944–1945: Myths and Realities', *Journal of Strategic Studies* 14/2 (June 1991) pp.210–31; Ian Gooderson, 'Heavy and Medium Bombers: How Successful Were They in the Tactical Close Air Support Role During World War II?', *Journal of Strategic Studies* 15/3 (Sept. 1992) pp.367–99.
- 35 Churchill and Churchill (note 13) p.112; Dupuy (note 8) pp.263–4; Hammel (note 8) pp.223–6; Israel MoD (note 13) pp.67–8; O'Ballance (note 8) pp.135–6; Nadav Safran, *From War to War* (New York: Pegasus 1969) pp.342, 346; Wald (note 2) p.84; and author's interviews with IDF military personnel, Jan. 1994 and Sept. 1996.
- 36 HERO (note 24) pp.35–9; JTCGME (note 31) esp. pp.1–18.
- 37 Dupuy (note 8) pp.263–4; Hammel (note 8) pp.223–6; Israel MoD (note 13) pp.67–8; O'Ballance (note 8) pp.135–6; Safran (note 35) pp.342, 346; Wald (note 2) p.84; and author's interviews with IDF military personnel, Jan. 1994 and Sept. 1996.
- 38 Dupuy (note 8) pp.310–11; El-Edroos (note 1) pp.386–8; Hammel (note 8) pp.369–81; Herzog (note 8) p.179; Israel MoD (note 13) p.104; Mutawi (note 1) p.137; O'Ballance (note 8) pp.203–207; author's interviews with senior IDF officers, Sept. 1996. Jordanian accounts of the battle claim that the 40th Armored Brigade was virtually obliterated by the IAF *in place* on the ridgeline, and the Israeli ground forces merely swept its remnants off the ridge after the battle was over. I have several reasons for disregarding this version. Although it is clear that the IAF was an important element of the Jordanian defeat at Qabatiyah crossroads, the speed of the final Israeli victory suggests that air power was not the only element of Jordan's defeat. The Israelis allowed only 15–30 minutes (accounts vary) for air strikes and artillery bombardment prior to their ground assault at dawn on 7 June. Even if the entire IAF had participated in the attack, it is almost inconceivable that 100–120 Jordanian armored vehicles camouflaged and dug in along a wooded, rocky ridgeline could have been destroyed by the IAF *in the dark* in just half an hour. In the best of circumstances, against exposed Jordanian columns moving during the day along the narrow roads of the Judean hills and unable to flee or hide, Israeli airstrikes appear to have achieved an armored-fighting-vehicle-kill-per-sortie rate of no better than 0.5 (and probably closer to 0.3). It is extremely unlikely that the IAF could have achieved a similar ratio against the 40th Armored Brigade in its positions at Qabatiyah crossroads. For the sake of argument, however, let us assume the IAF achieved a kill-per-sortie ratio of 0.5 and that it only killed 60 Jordanian tanks and APCs, causing the rest to flee. To accomplish this, the Israelis would have had to have flown 120 attack sorties just against Qabatiyah crossroads. Because half an hour was too short a time even for Israeli jets to conduct an attack on dug-in armor, return to base, refuel and rearm, return to the battlefield and conduct another strike, the Israelis would have had to have committed 120 aircraft to this mission. The entire IAF at the start of the war was only 207 operational aircraft, and by 7 June it was down to about 160–170. One would expect that if the Israelis had pulled nearly all of their aircraft off other missions to make a massive attack on Qabatiyah crossroads someone might have mentioned it, but none of the accounts of the Six-Day War or the histories of the IAF do, nor did any of the senior IAF officers I interviewed remember devoting the lion's share of their assets to this target. Instead, by all accounts, the air effort against Qabatiyah, while significant, did not necessarily receive more attention than the constant Israeli air effort against Jordanian forces retreating from the West Bank or those against the Egyptian army retreating from Sinai.

Moreover, the Israelis flew only 233 air-to-ground sorties against Jordan on 7 June, and again, if the majority of these had gone against Qabatiyah crossroads, I would expect this to have been mentioned in IAF accounts of the war or stuck in someone's memory. Of course, the Israelis found after the war that, in fact, they generally had achieved an armored vehicle kill-per-sortie rate of no better than 0.2 – which is also more in tune with historical norms (see HERO [note 24] pp.36–42). There is no reason to believe that the IAF strikes on the 40th Armored Brigade achieved better than this average and, given the disposition of the Jordanians (dug-in and dispersed), the terrain (wooded hills) and the time of day (before dawn), if anything, the IAF probably did worse than average here, probably closer to 0.1 armor kills-per-sortie. Consequently, to have inflicted even 25 per cent casualties on this brigade, a far cry from the Jordanian claims, would have required the Israelis to have flown roughly 300 sorties if the more accurate kill-per-sortie rate of 0.1 is used. Of course, with only 160–170 operational aircraft, it would have been physically impossible for the IAF to have generated so many sorties in half an hour, and we know for a fact that they only flew 233 air-to-ground sorties against all targets on the West Bank all day on 7 June. If the Israelis had flown every single ground-attack sortie that went against the West Bank on 7 June against Qabatiyah crossroads, they probably would have killed no more than 20–25 Jordanian armored vehicles given their actual armored vehicle kill-per-sortie rate. Assuming that the Israelis probably flew 50–75 sorties against Qabatiyah crossroads on the morning of 7 June, we could have expected them to have destroyed 5–8 Jordanian tanks and APCs, and no more than 15 tanks and APCs even if the IAF was able to achieve a 0.2 kill-per-sortie rate. This figure is entirely in keeping with the experience of other Arab armored forces under air attack during the rest of the war, and would hardly constitute the obliteration of 40th Armored Brigade by the IAF. It also accords well with the official US survey of damaged tanks after the war, which found that less than two per cent of Arab tanks destroyed during the war were destroyed by airstrikes. Consequently, it seems highly unlikely that the IAF alone could have mauled the 40th Armored Brigade given how little evidence there was of armored vehicles being destroyed by airstrikes (see JTCGME [note 31] esp. pp.1–17). As a final note, Nordeen also argues that the Israeli ground forces played the key role in defeating the 40th Armored Brigade at Qabatiyah. Nordeen's book is generally sympathetic to the IAF, and so if he claims that the IAF's role was secondary to the ground forces at Qabatiyah, there is strong reason to believe him (see Nordeen [note 8] p.79).

39 Gamasy (note 13) p.57; Hammel (note 8) p.244. Sadat claims that Nasser was told about the destruction of the Air Force around noon (p.175), while Nordeen and Nicole (note 8) state only that the EAF commanders were 'slow to report the true extent of the defeat' (p.211).

40 Author's interviews with former senior Egyptian military officers, Dec. 1997.

41 The survey team examined 203 destroyed Israeli and Arab tanks. Of these 176 were Arab tanks. Since all three Arab armies combined probably had 500–600 tanks destroyed in the fighting, this represents roughly 30 to 40 per cent of all Arab tanks destroyed. The tanks examined were all of the Arab tanks that in 1970 (the year of the US study) remained in the condition in which they had been found at the end of the war. All other tanks that had been both destroyed and captured by the Israelis had either been repaired and put into service with the Israeli army or used for target practice and thus were no longer reliable for the survey. There is no reason to believe that this sample represented anything but a random sampling: many of the tanks examined were slated to be used for target practice or refurbishment, hence it was not the case that the Israelis left the worst damaged tanks (or the least damaged) for last. See JTCGME (note 31) pp.1–16.

42 JTCGME (note 31) p.1.

- 43 HERO (note 24) pp.35–9, 41–2, 56, 89.
- 44 See for instance, Dupuy (note 8) pp.263–78, 304–305, 325–6; El-Edroos (note 1) pp.386; Gamasy (note 13) pp.64–5; Hammel (note 8) pp.246, 260–79, 374–5, 382–3, 418–24; Herzog (note 8) pp.160–65, 188; Israel MoD (note 13) pp.138–9; John Keegan, *World Armies* (London: Macmillan 1979) p.687; Moskin (note 16) p.351; Mutawi (note 1) 139–40; O'Ballance (note 8) pp.142–65, 250–58; Safran (note 35) p.342; Sharon (note 2) pp.198–203; Wald (note 2) pp.84–5; Young (note 8) p.112; author's interviews with senior IDF officers, Sept. 1996.
- 45 HERO (note 24) p.36. It is worth reiterating that, at least with regard to armored vehicle kills, Israeli pilot claims were two to four times greater than actual numbers as revealed in postwar assessments.
- 46 If IAF claims regarding destruction of trucks was even half as badly exaggerated as their claims regarding the destruction of armored fighting vehicles, then there is reason to believe the IAF may have destroyed no more than 400–500 trucks in Sinai. Of course, IAF claims may not have been as badly exaggerated with regard to thin-skinned vehicles. One reason for the discrepancies between IAF claims and actual kills of tanks and APCs was that many of the aerial munitions, particularly the 20- and 30-mm ammunition in the cannons on IAF fighter-bombers, could not penetrate tank armor. However, they could tear up a truck or jeep. Similarly, near misses from bombs or rockets were found to have had little impact on armored fighting vehicles, but could have destroyed trucks, cars and jeeps.
- 47 On the psychological impact of airstrikes on ground forces, see e.g. Ian Gooderson, 'Allied Fighter-Bombers Versus German Armour in North-West Europe 1944–1945: Myths and Realities', *Journal of Strategic Studies* 14/2 (June 1991) pp.210–31; Ian Gooderson, 'Heavy and Medium Bombers: How Successful Were They in the Tactical Close Air Support Role During World War II?', *Journal of Strategic Studies* 15/3 (Sept. 1992) pp.367–99; Stephen T. Hosmer, *Psychological Effects of U.S. Air Operations in Four Wars, 1941–1991: Lessons for Commanders* (Santa Monica, CA: RAND 1996); Group Capt. P.N. Lambert, RAF, 'Shattering Impact: The Psychology of Air Attack', in Richard P. Hallion (ed.), *Air Power Confronts an Unstable World* (London: Brassey's 1997) pp.83–109; Barry D. Watts and Thomas A. Keaney (eds), *Gulf War Air Power Survey, Volume II, Part 2: Effects and Effectiveness* (Washington, DC: GPO 1993) esp. pp.202–205, 221–26.
- 48 Dupuy claims that the head of the IAF History Branch told him that Israel flew 300 ground attack sorties against this unit (HERO [note 24] p.89). Given that the IAF flew only 549 ground-attack sorties against Jordan in the entire war (according to the IAF History Branch), it is ludicrous to claim that the IAF would have flown over half of all its ground attack sorties against Jordan on one day against one target.
- 49 HERO (note 24) p.89; Lunt (note 1) p.103; Narkiss (note 16) pp.242–3. IAF accounts claim that the Jordanian 2nd Regiment was destroyed in this action. However, other evidence indicates that, as with so many Israeli airstrikes, the actual damage inflicted was far less than claimed. In this case, the 60th Armored Brigade managed to retreat back to the east bank of the Jordan with 40 intact tanks on 7 June. The vast majority of these were from the 2nd Armored Regiment, which began the war with about 40 tanks, indicating that the Israeli airstrikes during the night of 6/7 June may have been terrifying, but did not destroy many Jordanian tanks (see Lunt [note 1] p.103). Again this finding brings what otherwise would have been a significant statistical outlier back in line with the conclusions of the Israeli and American postwar assessments which found that few armored vehicles were actually destroyed in airstrikes and that actual physical damage from airstrikes had been greatly exaggerated. Note that the HERO account, drawing as it does on the official IAF historian, incorrectly claims that

it was an entire Jordanian armored brigade mauled on the Edom ascent. Because by the time this event occurred, two battalions of the 60th Armored Brigade had already been smashed at Tel al-Ful, and the 40th Armored Brigade was then slugging it out at Qabatiyah crossroads, this could only have been the last battalion of the 60th Brigade, moving to reinforce Jerusalem which it was ordered to do after the defeat of the rest of its brigade earlier in the day. The eyewitness account in Narkiss also makes clear that the force was a battalion in strength, not a brigade.

- 50 Hammel (note 8) p.344; HERO (note 24) p.89; Narkiss (note 16) pp.242–3.
- 51 This was suggested in an interview with former IAF Commander, Lt. Gen. Binyamin Peled, IAF (Ret.), in Sept. 1996.
- 52 Nordeen and Nicole (note 8) pp.208–212.
- 53 Anwar el-Sadat, *In Search of Identity* (NY: Harper and Row, 1997) pp.174–5.
- 54 Gamasy (note 13) pp.52–60; Sadat (note 53) pp.174–5.
- 55 Gamasy (note 13) p.56.
- 56 See in particular on this point, George Gawrych, 'The Egyptian Military Defeat of 1967' (note 13) pp.277–305.
- 57 Mutawi (note 1) p.139.
- 58 For a more thorough discussion of the tactical incompetence of all three Arab armies during the Six-Day War, see Kenneth M. Pollack, *The Arabs at War: Arab Military Effectiveness, 1948–1991* (Lincoln, NB: University of Nebraska Press, 2002).
- 59 Narkiss (note 16) p.113.
- 60 For a concurring assessment, see Hosmer (note 47).
- 61 This is also an important lesson for military intelligence personnel and other military experts who must try to gauge the effectiveness of air attacks: if the effect of an airstrike is measured simply by the number of tanks, APCs or artillery destroyed, the analyst will greatly underestimate the actual impact of the attack.
- 62 For a good argument that these new weapons could radically improve US air capabilities, see David A. Ochmanek, Edward R. Harshberger, David E. Thaler and Glenn A. Kent, *To Find and Not to Yield: How Advances in Information and Firepower Can Transform Theater Warfare* (Santa Monica, CA: RAND 1998).
- 63 Tim Weiner, 'Pentagon Loses Fight to Keep Report on Gulf War Secret', *The New York Times*, 29 June 1997, p.20; Tim Weiner, 'Smart Arms In Gulf War Are Found Overrated: Pentagon's Reliance On High-Tech War Questioned in Review', *International Herald Tribune*, 10 July 1996, p.1. In Kosovo, precision-guided munitions achieved an accuracy of 70 per cent hitting their aim points – see William Arkin, 'Smart Bombs, Dumb Targeting?' *The Bulletin of the Atomic Scientists* 56/3 (May/June 2000) pp.46–53.
- 64 During Operation 'Desert Storm', Coalition air forces flew over 41,000 ground-attack sorties against Iraqi forces in the Kuwaiti Theater of Operations (KTO): Eliot A. Cohen (ed.), *The Gulf War Air Power Survey, Volume V, Part I: Statistical Compendium*, hereafter referred to as GWAPS (Washington, DC: GPO 1993) p.467. The reader should note that this number, while at first blush seeming outrageously high, corresponds with the same categories as flown by the Israelis in the Six-Day War. The IAF flew 2,591 interdiction and close-air support missions in 1967, and not all of these were specifically intended for tank-killing: many blew up bridges, command and control facilities, depots, etc. Thus these numbers correspond with the 41,000 listed by GWAPS for interdiction and CAS sorties in the KTO. They also correspond with the numbers used in the HERO study of airstrikes against armored forces (HERO [note 24] esp. p.59).

These 41,000 sorties eventually may have destroyed as many as 1,000 Iraqi tanks and 600 Iraqi APCs, producing an AFV-kill-per-sortie rate of 0.039. Accurate numbers of Iraqi equipment destroyed by airstrikes during the Gulf War remain elusive. We may never know precisely how many vehicles were killed in the air campaign because the Iraqis did not keep accurate records themselves (debriefs of unit commanders and records captured during the Gulf War are extremely spotty: some units kept very accurate counts of destroyed equipment, others did not). I arrived at these numbers in the following manner. First, according to the most accurate assessment of Iraqi strength – a CIA equipment count using U-2 imagery of the entire theater taken immediately after the war – the Iraqis had 3,475 tanks and 3,080 APCs in theater at the start of the war (E. Cohen (ed), *The Gulf War Air Power Survey, Volume II, Part I: Operations*, p.254). Second, the CIA found that of the 2,665 tanks in the 12 heavy divisions Iraq deployed to the KTO, 1,135 (43 per cent) did not move to fight or flee during the ground war. Likewise, of the 2,624 APCs in these same 12 divisions, 827 (32 per cent) did not move during the ground war. (See Central Intelligence Agency, *Operation Desert Storm: A Snapshot of the Battlefield* [Washington, DC: GPO Sept. 1993].) These 1,135 tanks and 827 APCs represent the upper end of the number of tanks and APCs in these 12 divisions that might have been destroyed by the air campaign. However, the actual number is probably considerably lower because many of these tanks did not move not because they were destroyed by airstrikes, but because they were abandoned by frightened crews or were inoperable because of maintenance problems. Postwar inspections of Iraqi equipment found that as many as 50 per cent of tanks and APCs in some units were simply abandoned in this fashion. Debriefings of Iraqi prisoners of war revealed that large numbers of vehicle crews abandoned their tanks and APCs and surrendered or fled rather than try to stop the Coalition ground offensive. Similarly, the Iraqis have always had abysmal maintenance practices and an operational readiness rate of 65 per cent is the norm in combat units. Indeed, during the Iran–Iraq War, readiness rates of around 50 per cent for tanks and APCs was commonplace in Iraqi line formations. Consequently, the actual number of tanks and APCs in the 12 heavy divisions that were destroyed by airstrikes during the Gulf War was probably no more than half of those that the CIA study found did not move during the ground war – or 568 tanks (21 per cent) and 414 APCs (16 per cent).

In addition to the tanks and APCs in the 12 armored and mechanized divisions in the KTO, the Iraqis also deployed 810 tanks and 456 APCs in independent brigades and battalions, as well as battalions attached to some of the 39 infantry divisions deployed in the KTO (CIA, *Operation Desert Storm*). The air campaign clearly destroyed some of these too. In fact, air power probably destroyed a greater percentage of these vehicles than those in the Iraqi heavy divisions. The Coalition flew more sorties and had much longer loiter times with its deadliest tank-killing aircraft – the A-10 Thunderbolts – against the frontline infantry divisions and their supporting armor in the south of the KTO, than against the heavy divisions farther north (GWAPS, *Volume II, Part I: Operations*, pp.268–82). Moreover, both the CIA study and anecdotal accounts from Iraqi personnel captured during the war also indicate that tanks and APCs attached to frontline infantry divisions suffered more than those in the heavy divisions. See CIA, *Operation Desert Storm*; Richard Hallion, *Storm over Iraq* (Washington DC: Smithsonian Institution Press, 1992) p.217; US Department of Defense (DoD), *Conduct of the Persian Gulf War* (Washington, DC: GPO 1992) pp.158–60. Consequently, it seems

reasonable to believe that these units had a greater percentage of tanks and APCs killed than the heavy divisions, perhaps as much as 50 per cent tank losses and 40 per cent APC losses, which would equate to another 405 tanks and 182 APCs. (I would not go higher than this because many of these armored vehicles were deployed along the Kuwaiti and Iraqi coasts and in the northern KTO where they did not suffer the same pounding as those units along the Iraqi frontlines.)

These rough estimates produce a total number of armored vehicles probably destroyed by the Coalition air campaign of 983 tanks (28 per cent) and 596 APCs (19 per cent). As a final note, the largest US survey of Iraqi armor captured during the war found that only 10–20 per cent had been destroyed by air attack. Although this survey examined only six per cent of all Iraqi tanks destroyed during the war, and then only those in a small part of the KTO, it nonetheless indicates that while my numbers may not be precise, they are probably not off by much and, if anything, probably *overstate* the amount of physical destruction caused by airstrikes. See, United States General Accounting Office, *Operation Desert Storm: Evaluation of the Air Campaign*, Report to the Ranking Minority Member, Committee on Commerce, House of Representatives (Washington, DC: GPO June 1997).

The tank kills-per-sortie ratio for Coalition air forces in the Gulf may seem strange given the complete air superiority and sophisticated munitions of the US Air Force. However, there were several factors that mitigated against killing Iraqi tanks. First, only a small percentage of the munitions dropped on Iraqi ground forces were precision munitions. Second, the Coalition high command largely insisted that airstrikes be conducted from medium altitudes where aircraft were not vulnerable to Iraqi anti-aircraft guns or man-portable surface-to-air missiles. Third, the Iraqis were able to disperse, camouflage, berm and dig-in their armor during the coalition air campaign. Because of the extensive Iraqi passive defenses, really only precision-guided munitions were able to destroy dug-in Iraqi armor, and even for PGMs, their accuracy was considerably degraded by the need to stay at medium altitudes. See *GWAPS, Volume II, Part II: Effects and Effectiveness*, pp.202–30.

65 During Operation 'Allied Force', NATO aircraft flew 3,400 ground attack sorties against Serb ground forces in Kosovo and claim to have destroyed 246 Serb tanks and other armored fighting vehicles. See Department of Defense, *Report to Congress: Kosovo/Operation Allied Force After Action Report* (Washington, DC: DoD 2000) p.86; Ivo H. Daalder and Michael E. O'Hanlon, *Winning Ugly: NATO's War to Save Kosovo* (Washington, DC: Brookings 2000) p.154. This works out to an AFV-kill-per-sortie rate of 0.07, slightly *lower* than the historical average found by the HERO study of 0.1 to 0.3 (HERO [note 24] pp.36–42, 59). On the other hand, this figure is nearly double the 0.039 rate Coalition forces appear to have achieved during the 1991 Gulf War. This increase probably reflects the impact of the new munitions, but may also in part be attributable to the fact that KLA pressure on the Serb army forced them to concentrate forces, making them more vulnerable to airstrike. Whereas, the vast majority of Coalition airstrikes against Iraqi armor occurred before the Coalition ground offensive, and so the Iraqis were able to remain in their bermed positions (Daalder and O'Hanlon , pp.153–4, 200–202).

66 Richard Norton-Taylor, 'How the Serb Army Escaped Nato', *The Guardian*, 9 March 2000, available at < <http://www.guardian.co.uk/Kosovo/Story/0,2763,193539,00.html> > (accessed July 2001).

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