

Overreliance on Technology in Warfare: The Yom Kippur War as a Case Study

ROBERT S. BOLIA

Modern military journals are replete with articles claiming that recent advancements in technology constitute a Revolution in Military Affairs (RMA). The authors of these articles claim that innovations in weapon systems—for example, the development of precision guided munitions—and the capacity to wage network-centric warfare are symptomatic of this RMA, and will afford the United States an unprecedented level of situational awareness and the ability to apply force rapidly, accurately, and precisely without fratricide or collateral civilian casualties.¹ Should these prophets be believed?

One of the questions that is often sidestepped in these discussions is whether advancements in technology can fundamentally change the character of war. Classical theorists suggest that the essential nature of war is immutable, and as such one is able to derive from its study principles that commanders will always be able to use to guide the development of strategy and tactics.²

On the other hand, it is difficult to argue that technology has not been a factor in warfare. In 1298, for example, it was the English use of the long-bow that broke the line of the Scots at Falkirk; the same technology was used to similar effect against the French at Crécy in 1346, at Poitiers in 1356, and at Agincourt in 1415. But had technology changed the nature of war? While the French suffered repeated defeats, the Scots learned their lesson at Falkirk, and when they fought the English again, just 16 years later at Bannockburn, they held a contingent of cavalry in reserve to attack the English archers as soon as they appeared. The archers broke and the English were routed.³

Clearly technology has been able to affect the outcome of individual battles, but can it change the nature of war? Italian theorist Giulio Douhet be-

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lieved that the invention of the airplane had done just that. Douhet, one of the fathers of strategic bombing, suggested several reasons for his belief: (1) with air power it is no longer necessary to break through the enemy's front lines before attacking his rear; (2) air power can attack industrial and command and control sites in the rear of the enemy army, which can prevent him from adequately communicating with or resupplying his forces; and (3) air power allows for the indiscriminate bombing of civilians as well as soldiers. The first two points, though overstated by Douhet, are important, and have been implemented in nearly every war since the dawn of air power. But the third point is most interesting, not so much for its content but for the peculiar corollary Douhet draws from it: that the mere threat of aerial bombardment of civilian targets will cause governments to capitulate even before the commencement of hostilities, and in fact may bring about an end to warfare.⁴ Needless to say, this has not occurred.

There are two problems with Douhet's interpretation. The first is that the invention of aircraft simply added another dimension in which combat may occur. The role of the air force in combat is the same as that of the army or the navy—the application of force to an enemy's centers of gravity. The second is that Douhet overestimated the ability of strategic bombing to rapidly destroy the enemy's ability to make war, and underestimated the capacity of civilian populations to endure aerial bombardment. Both of these points were noted during the Second World War, and in many wars since.

Proponents of network-centric warfare, like those of strategic bombing, claim that this new concept of operations will engender an RMA that will fundamentally change the nature of warfare. It too has its discontents, however. Thomas Barnett has enumerated seven reasons why network-centric warfare may not fulfill all of its promises, while Milan Vego has returned to the Clausewitzian argument that technology cannot change the character of war.⁵ More recently, my colleagues and I have analyzed examples from modern military history to derive five principles that should be applied before introducing technological solutions to problems of decisionmaking and command and control.⁶ These voices of caution are endorsed by a decade of research by cognitive psychologists on the negative consequences of human interaction with automated systems, including, but not limited to, complacency associated with overreliance on the automation.⁷

Robert Bolia is a computer scientist at the US Air Force Research Laboratory's Human Effectiveness Directorate, Wright-Patterson Air Force Base, Ohio, where he studies the application of advanced technology and automated decision support systems to problems of military decisionmaking and command and control. He is currently completing a master's degree in joint warfare at American Military University.

Despite these concerns, there is little doubt that technology solutions will continue to be promoted regardless of their potential to lead to negative outcomes. The purpose of the present article is to describe the consequences of overreliance on technologically advanced systems over the course of a single war. The Yom Kippur War was selected for this analysis for three primary reasons. First, it was brief. There are certainly more examples of the misuse of technology in longer wars, but their enumeration would take proportionally longer. Second, it was recent enough to have included a number of examples of technological advancements not present in the Six-Day War, fought just six years before. Finally, it represents the culmination of a series of five wars between Israel and her Arab neighbors fought over the course of a quarter of a century. All of the armies involved were experienced at the practice of warfare and were familiar with the terrain over which they were fighting. This facilitates the analysis by reducing the likelihood of inexperience or unfamiliarity with the battlefield creeping up as possible causes of failures.

The Yom Kippur War

The Yom Kippur War, also known as the October War or the Ramadan War, was launched at 2 o'clock on the afternoon 6 October 1973, when Egyptian infantry armed with anti-tank weapons crossed the Suez Canal and assaulted the Bar-Lev Line in the southwest.⁸ Simultaneously, on Israel's northeastern border, Syrian armor attacked Israeli positions all along the Golan Heights. The coordinated attack came as an almost complete surprise to Israel, which was very much unprepared for war.

On the Golan front, Syrian tanks penetrated nearly eight miles into Israeli territory over the course of two days before the Israeli Defense Forces (IDF) were able to stabilize the battlefield and prepare to counterattack. By war's end, Israeli forces had fought their way 15 miles beyond the so-called "Purple Line" that had divided the two nations before the outbreak of hostilities, beating off attacks by Iraqi and Jordanian armored forces along the way. In addition, the IDF destroyed some 1,400 enemy tanks and inflicted more than eight times as many casualties as it suffered.⁹

The result in the Sinai, while not so dramatic, was in many ways analogous. The Egyptians made a highly successful crossing of the Suez Canal along a broad front, enveloping most of the Israeli defensive positions. However, they failed to press their advantage, and the IDF not only counterattacked but also crossed the canal in force, leaving the Egyptian Third Army completely surrounded. While Egypt still retained positions on the east bank at the time of the cease-fire imposed by the United Nations, momentum had shifted Israel's way, and from a military standpoint Israel was the clear victor.¹⁰

Yet despite Israel's eventual military success, victory was not a certainty from the start. Israeli intelligence, due largely to overreliance on technology, had failed to predict the invasion in spite of the existence of a relatively complete situational picture. In terms of doctrine, the IDF relied far too heavily on both the use of armor and the assumption of air supremacy. Egypt and Syria also imparted too great an importance to the technology of war and not enough to what Clausewitz called "the moral dimensions." In the end, it would be Israeli attention to these intangibles, and an Arab neglect thereof, that cost the Arabs the war.

Complacency and the Interpretation of Intelligence

That the Yom Kippur War began as a surprise to the IDF was a testament not so much to the ability of the Arab armies to conceal their actions as to the arrogance of the Israeli leadership. Indeed, Egyptian leaders had anticipated that despite their considerable efforts at deception, the Israelis would discern their intention to attack several days before the attack was scheduled to occur. They were counting on Israeli mobilization providing them enough time to cross the canal and establish bridgeheads, which they expected to be able to hold until the United Nations could mandate a cease-fire. The Egyptian high command estimated that the army would suffer 26,000 casualties in the act of crossing the canal, including some 10,000 killed. Because of the almost complete surprise of the operation, the dead numbered only 208.¹¹

The overconfidence of the Israeli general staff was due to a number of factors that are not necessarily independent. For example, there was the awareness that the Israeli Air Force (IAF) was in many ways superior to the Arab air forces. Tied with this, however, was the view that the IAF's preemptive destruction of the Egyptian, Syrian, and Jordanian air forces had enabled the final victory of the IDF in the Six-Day War, coupled with a certainty that the Arabs shared this view. From these data the Israelis deduced that Egypt would not attack until she had sufficient numbers of medium bombers and fighter-bombers to enable her to strike Israeli airfields deep inside Israel. While some of the assumptions were correct, it was not true that the war had been won because of the IAF—Arab units in the field had collapsed due to lack of leadership, not to lack of air support—nor was the model of Arab decisionmaking valid. Of course the Arabs had realized the need to be able to combat the IAF, but, as the October War would demonstrate, destruction of runways was not the only solution.¹² "They forgot," wrote Mohamed Heikal, Egypt's Minister of Information in 1973, "that it was not their genius but our failure that handed them victory in 1967 on a plate."¹³

While one source of Israeli overconfidence was the inappropriate model of Egyptian military planning, there were certainly others. First, Israe-

lis generally had contempt for the Arab soldier. However, while it is true that the Arabs had been routed in both 1956 and 1967, it is not true that they could not fight well. In fact, like most troops, they fought well when they were led well. But leadership in the Arab armies in the 1950s and 1960s had been generally poor, with general officer positions being filled by political appointees rather than the most qualified professional soldiers.¹⁴

Second, after having scored a perfect four victories in four tries against various combinations of Arab armies, IDF commanders had developed a sense of invincibility.¹⁵ This led many Israelis to the conclusion that any war with their Arab neighbors would quickly result in certain victory. Indeed, Israeli Chief of Staff David Elazar had noted that “in the context of the 1973 balance of power, Egypt has no chance whatsoever of accomplishing any significant military goal [against Israel].”¹⁶ Sadly, the corollary to this theorem was that there was little reason to make any concessions to Egypt, Jordan, or Syria in exchange for peace.¹⁷

Finally, the IDF placed great confidence in AMAN, its military intelligence service. But AMAN suffered the same delusions of invincibility as the remainder of the IDF, and held the same disdainful view of the Arab forces. This led to misuse of the considerable intelligence technology AMAN could bring to bear on the Egyptian and Syrian deployments, and consequently a failure to predict the war in a timely fashion.

For example, on 4 October—just two days before the crossing of the canal—Israeli reconnaissance aircraft took photographs that demonstrated a significant increase in the amount of Egyptian artillery, tanks, and bridging equipment on the banks of the canal. The Israelis were not fazed. They simply could not bring themselves to believe that the Egyptians would attack, and as a result they adopted the interpretation that the Egyptian Army was deploying only for an exercise.¹⁸

This view was supported by signals intelligence. The Israeli intelligence services had erected listening posts all along the Suez front, and they intercepted large quantities of Egyptian military communications. But the Egyptian high command was not communicating via electronic means in the days preceding the attack on the Bar-Lev Line. Unfortunately for Israel, many of the communications intercepted during this period were part of a deception campaign to convince the IDF that an attack was not imminent, including instructions for units to renew leaves and permissions for officers to make the pilgrimage to Mecca. These ruses were typically accepted at face value by AMAN.¹⁹

On the other hand, when Arab commanders made mistakes and transmitted vital information about the operation, the Israelis ignored it. On the same day as the Israeli photoreconnaissance, signals intelligence intercepted

an order from the Egyptian high command to break the Ramadan fast, a sure sign that something extraordinary was about to occur. It too was ignored.²⁰

Technology and Doctrine

The IDF had not remained stagnant since the Six-Day War in terms of technology. Its weapons inventory had been augmented substantially by shipments of Skyhawk and Phantom jets from the United States, along with Hawk surface-to-air missiles, M60 tanks, M113 armored personnel carriers, and M109 self-propelled artillery pieces. Egypt and Syria also had received large quantities of modern weapon systems from their Soviet allies, including MiG-21s and MiG-25s; SA-2, SA-3, SA-6, and SA-7 surface-to-air missiles; Sagger shoulder-launched, wire-guided, anti-tank missiles; and T-62 tanks.²¹ Both sides were well equipped for the impending battle. The major problem for the IDF would be that it had modernized its weapons but not its doctrine.

In war there is always a concern that an army will learn lessons from its previous combat experience and apply them stringently to future combat scenarios, regardless of whether they are applicable. The IDF general staff had certainly fallen into this trap, to the extent that by 1973 they were prepared to fight not the last war, but the war before last. Both the Suez Conflict and the Six-Day War had left the Israelis with the impression that wars on the ground were won by armor and armor alone. As a result, they failed to develop an integrated infantry-armor doctrine, and effectively eschewed the use of infantry. This was epitomized by the IDF's abandonment of the flexible task force as its division organizational concept, in favor of the armored division.

This overreliance on armor would prove to be devastating to the IDF on a number of occasions, the most notorious of which was the attack on Tel Shams, a well-defended hill on the Golan Heights. In one attempt on 12 October, 28 tanks of the Israeli 7th Armored Brigade attempted to take the position, but were beaten back by Syrian infantry armed with Sagger anti-tank missiles. The assault failed terribly, resulting in heavy casualties and the loss of all but two of the tanks. The next day, the same position was taken by Israeli paratroopers with a loss of only four wounded. This effectively proved to the Israelis that armor should not be the weapon of choice for every mission, one of the most important lessons the IDF was to learn in the Yom Kippur War.²² On the other hand, it also demonstrated that when stripped of their technological advantage, Syrian troops were no match for the highly trained, highly motivated IDF.

While the Israelis misinterpreted the results of the Six-Day War in their development of an armor-only doctrine, what they seem to have forgotten with respect to armor was its application to flexible mobility. Instead, they constructed a line of fortifications along the canal—the Bar-Lev Line, named

for the IDF Chief of Staff at the time—and settled into a doctrine of static defense. Not only had this failed the French in World War II, it had failed the Israelis in the War of Attrition, although they were still clinging to it in 1973.²³

Clausewitz wrote, “Defense is the stronger form of waging war.”²⁴ The Israelis were counting on this when they built their line of defense. The Suez Canal itself constituted what Israeli Defense Minister Moshe Dayan called “one of the best anti-tank ditches available.” The Israelis had made the canal even more of an obstacle by creating sand levees ranging in height from 18 to 75 feet all along the canal. Further east, they had erected a series of fortifications whose guns were sited to provide overlapping fields of fire against an Egyptian force attempting to cross the canal. While formidable, these works were not designed to withstand a long siege, but only as fortified observation posts, strong enough to hold out until the armor arrived.²⁵

But armor was precisely the problem. First, there was not nearly enough of it along the canal to prevent a crossing on a broad front. Second, while Israel had developed its entire doctrine around armored technology, Egypt and Syria had developed a doctrine for combined-arms operations specifically designed to counter Israeli armored tactics. This involved spearheading armored operations by massive artillery bombardments, followed by large formations of infantry armed with hundreds of portable anti-tank weapons. Of course the Israelis were familiar with the existence of these weapons and their presence in the Arab inventories. There was nothing particularly novel about them, after all. What came as a shock to the IDF was the sheer number of them. When the Israeli tanks arrived on the scene, whether in the Sinai or on the Golan front, they were decimated. It was a classic move on the part of the Arabs: striking an Israeli center of gravity with as much force as possible.²⁶

Part of the IDF’s problem was its overreliance on armor; another equally important component was its underreliance on artillery. The latter was related to the fact that in most of the wars fought previously between the Israelis and their Arab neighbors, the IAF had gained air superiority within the first few days of the conflict, allowing its planes to be used in a close air support role. Thus the IDF developed a doctrine similar to that of the US Marine Corps, which uses aircraft to strike the forward edge of the battle area in lieu of artillery. The difficulty in 1973 was that air supremacy was hard to come by.²⁷

The reason for this was the air defense system developed by Egypt and Syria in coordination with their Soviet allies during and after the War of Attrition. Arab airspace was protected by hundreds of batteries of surface-to-air missiles, hundreds more mobile and shoulder-launched missiles, and thousands of batteries of radar-guided, anti-aircraft artillery. In combination these weapon systems provided interlocking fields of fire from ground level to somewhere above 60,000 feet.²⁸

The existence of the missile umbrella was not a surprise to the IAF. Israeli pilots had come up against it in the War of Attrition, and they knew that their planes were vulnerable. But in the three years of relative quiet since then, the IAF had developed countermeasures and other techniques for taking the missile batteries out of the equation. The problem was, all of their planning was based on preemptive strikes, since AMAN had guaranteed the IDF at least 48 hours' notice prior to an Arab attack. On Yom Kippur, that notice was not given.²⁹

The IAF performed well in the Yom Kippur War, downing scores of Egyptian and Syrian aircraft in dogfights with a loss of only four of its own jets. At the same time, it lost 100 planes to surface-to-air missiles or anti-aircraft fire, and, because of the missile umbrella over the Arab forces, it was unable to be used effectively in a close support role for much of the war.³⁰ This did not represent a failure of technology on Israel's part, but rather—as was the case with the IDF's armor—a failure to recognize that there are limits to the effectiveness of technology, and that the way to extend these limits is by the development of tactics and doctrine appropriate for a wide range of situations. By relying on a doctrine based on a preemptive strike, the IAF had essentially taken itself out of the ground war.

Of all of the services, it was the Israeli Navy that was most prepared to fight the Yom Kippur War. Since 1967, the Israeli Navy had been completely refurbished, and now boasted a fleet of 14 small, fast, missile boats armed with Israeli-produced Gabriel ship-to-ship missiles. Both the Egyptians and the Syrians had their own missile boats, armed with Soviet-built Styx missiles, which had almost twice the range of the Gabriel. Despite the technological superiority of the Arab missiles, the Israelis sunk four Syrian missile boats in the Battle of Latakia—the first naval missile battle in history—and three Egyptian missile boats in the Battle of Damiette-Balatin, without losing a single vessel. This feat was achieved by the use of aggressive tactics and electronic countermeasures, which allowed the Israeli vessels to evade the 52 Styx missiles launched against them.³¹

The Moral Dimensions

Much of this article has been devoted to discussions of Israeli intelligence and doctrinal failures in the Yom Kippur War due to overreliance on technology, yet the fact remains that Israel emerged victorious from the war. How does one account for this? Clausewitz suggested that in addition to massing forces against centers of gravity, one must consider the “moral dimensions,” which he believed were “the most important to pay attention to in war.”³² Among these he counted the skill of the commander, the military virtue of the troops, and the sense of “national spirit” (*Volksggeist*).³³ Superiority

in these factors could overcome not only friction, but also an enemy's superiority in technology.

The Arab armies—with the possible exception of Jordan—had long suffered from a dearth of good leadership, largely because general officer positions were often awarded based on political connections rather than on a general's ability to conduct campaigns. The Egyptians and the Syrians both had worked toward ameliorating this problem after “the setback”—an Arab euphemism for the Six-Day War—with positive results.³⁴ Still, their generals had nowhere near the experience of the Israeli commanders, nor the respect of the troops.

Most of the Israeli generals had led troops in all of Israel's wars since 1948. They were very experienced—arguably there were no general officers in any army in the world in 1973 with as much combat leadership experience as the Israelis—and they were very confident. Furthermore, they inspired confidence in their subordinates, who were also able leaders. Israeli officers have a tradition of leading from the front, rather than from a rear headquarters area, and were generally not willing to send troops into a fight that they would not go into themselves. This is reflected in very high rates of officer casualties in all of Israel's wars, but especially for tank commanders operating on the Golan Heights in 1973.

While the officers were experienced and courageous, so were the troops. Israeli soldiers had fought in four wars since the founding of their country, and their experiences—with their officers, with each other, and ultimately with the victories they had won—had positively reinforced their behavior. War was nothing new to them, and they were well trained for it.

The Israelis also possessed what Clausewitz called *Volksgeist*, a patriotic or national spirit. Because the goal of the Arabs in most of their wars with Israel was the eradication of Israel as a nation, the Israelis always felt as though they were fighting not simply to win, but also to exist. This was a unifying factor, like the natural camaraderie associated with the common bond of military service. But in the Yom Kippur War, there was more to it than that. Israel was now 25 years old, and those who had fought as young men in the War for Independence were still fighting. But this time their sons and daughters were fighting as well. Major General Chaim Herzog relates a story that illustrates the point:

Early in the war [General Benjamin Peled, commander IAF] attended an off-the-record briefing given by Minister of Defence Moshe Dayan to the editors of the Israeli press. Peled reported on the air war and mentioned in passing the loss of an Israeli plane that morning of which the crew was missing. While he was speaking a note was passed to him; he read it and commented, “interesting.” Looking up he reported that the missing pilot and navigator had been recovered

by a rescue team and were on their way back to their airfield. At this point Dayan interjected that the pilot was Peled's son. "Yes," said Peled, adding with an expressionless look on his face, "and tonight they will be in action again."³⁵

It was, as Herzog noted, a war of fathers and sons.

This has implications not only for families or for the camaraderie of the troops, but also for the Israeli society. In Israel, military service is very much a part of normal life. While some authors have pointed out that this has engendered an over-militarization of Israeli society, and occasioned a loss of traditional values, it has certainly been a factor in the development and training of the IDF as an effective fighting force.³⁶

Conclusion

One of the imprints of the Yom Kippur War on military history has been the lessons it has provided regarding the danger of relying on technology as a replacement for doctrine, tactics, and training. This has been demonstrated in this article by examining the overreliance on signals intelligence—which is only as good as the information it intercepts, and ultimately its interpretation—that led to the Israelis being surprised by the attack on 6 October 1973; and by looking at Israel's failure to develop a combined-arms doctrine, relying instead on armor and the Israeli Air Force to the exclusion of adequate infantry and artillery, in the face of Arab armies and air forces that had developed such doctrine.

The article also has pointed out that while the Israelis were able to overcome their deficiencies, they did so only by means that were completely independent of technology: the quality of their leaders, the quality of their troops, and their national spirit. This should not be taken to mean that advancements in technology have no place in warfare. Rather, the interpretation should be that technology must not be allowed to surpass the development of doctrine and tactics to guide its usage, nor hailed to the exclusion of the human element.

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