

Precision-guided Munitions and Conventional Deterrence

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For ten years a revolution has been taking place in the realm of conventional weaponry, the principal result of which has been the proliferation of extremely accurate and therefore lethal weapons. The revolution centres on a type of weapon labelled precision guided munitions (PGM), although a number of key developments do not fall under the PGM rubric.¹ When PGM first began to attract public attention, some analysts claimed that these new weapons would favour the defence over the offence and thus enhance deterrence.² There was even talk about the 'death of the tank'. However, others pointed out that the claims made on behalf of these new weapons were greatly exaggerated and that they could be used effectively by both sides – and therefore they might weaken deterrence.³

The effect of PGM on conventional deterrence can best be understood by examining specific military strategies. On the modern battlefield, the essence of military strategy is how the offence and defence employ their armoured forces. There are two 'ideal' strategies between which an attacker can choose. First, the attacker can seek to defeat an opponent by engaging in numerous battles of annihilation, or set-piece battles. Ultimate success is predicated on wearing the defence down to the point where resistance is no longer possible. Second, the attacker can employ a strategy which is commonly referred to as the *blitzkrieg*. The mobility and speed inherent in an armoured force provide the means to defeat an opponent decisively without engaging in a series of bloody battles. The remarkable victories achieved by Germany in the early years of World War II, and decades later by Israel in the Middle East, amply demonstrate that total defeat of an opponent without resorting to numerous battles of annihilation is possible.

In a crisis, if one side thinks it can launch a successful *blitzkrieg*, it is unlikely that that side

will be deterred from striking. On the other hand, if the only strategy available to both sides is to engage in a series of set-piece battles, both sides will be very reluctant to attack. Certainly, one of the main reasons why Hitler had no reservations about striking against France was that the 1939 Polish campaign demonstrated that the *blitzkrieg* provided him with a superb weapon for quickly defeating an enemy.⁴

Therefore, the key question at hand is: what effect do PGM have on the *blitzkrieg* strategy? Do these weapons favour the attacker or the defender? Before considering these questions,

¹ Generally, a PGM is defined as a missile that is extremely accurate because it has a terminal guidance system. An example of a significant development in accuracy which is not PGM-related in a strict definitional sense is the greatly improved accuracy of main tank guns.

² See James Digby, 'Precision Guided Weapons', Adelphi Paper No. 118 (London: IISS, 1975); Colonel Edward B. Atkeson, 'Is the Soviet Army Obsolete?', *Army*, Vol. 24, No. 5 (May 1974), pp. 10–16; Colonel Stanley D. Fair, 'Precision Weaponry in the Defence of Europe', *NATO's Fifteen Nations*, Vol. 20, No. 4 (August/September 1975), pp. 17–26; and Kenneth Hunt, 'New Technology and the European Theater', in *The Other Arms Race*, edited by G. Kemp, R. Pfaltzgraff, Jr, and U. Ra'anan (Lexington, Mass.: Lexington Books, 1974), pp. 109–123. It is interesting that there is widespread agreement among Soviet defence analysts that these new weapons favour the defence. See Phillip A. Karber, 'The Tactical Revolution in Soviet Military Doctrine', unpublished paper, 2 March 1977.

³ See James L. Foster, 'The Future of Conventional Arms Race', *Rand*, August 1975, P-5489; Richard Burt, 'New Weapons Technologies: Debate and Directions', Adelphi Paper No. 126 (London: IISS, 1976); Richard M. Ogorkiewicz, 'The Future of the Battle Tank', in Kemp *et al.*, pp. 43–55; Uri Ra'anan, 'The New Technologies and the Middle East: "Lessons" of the Yom Kippur War and Anticipated Developments', *ibid.*, pp. 79–90; and Jeffrey Record, 'Outwitting "Smart Weapons"', *The Washington Review of Strategic and International Studies*, Vol. 1, No. 2 (April 1978), pp. 83–85.

⁴ See John Strawson, *Hitler as Military Commander* (London: Batsford, 1971), and Hans-Adolf Jacobsen, 'Dunkirk 1940', in *Decisive Battles of World War II: The German View*, edited by Hans-Adolf Jacobsen and Jürgen Rohwer (London: Andre Deutsch, 1965).

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two points are in order. First, even before the advent of PGM, the mere employment of a *blitzkrieg* strategy did not guarantee success. Contrary to the popular opinion of the time, the fall of France did not signify the ascendance of the offence. A defender skilled in the art of mobile armoured warfare can stymie an offence using a *blitzkrieg* strategy.⁵ The issue is whether PGM enhance the defence or the offence, not whether they finally provide a means for thwarting the *blitzkrieg*. Second, this article will focus on those PGM which directly impact on the battlefield-weapons like *TOW*, *Sagger*, *Dragon*, *Milan*, *Maverick* and the various surface-to-air missiles (SAM). Long-range PGM like the cruise missile, that can strike important targets in an opponent's rear, and air-to-air precision guided munitions will not be examined.

PGM and the Blitzkrieg

The *blitzkrieg* depends on achieving numerical superiority at a point(s) in the opponent's front, piercing this front, and then following the path of least resistance into the enemy's rear. Although it may be necessary to engage in a set-piece battle to facilitate the initial breakthrough, a high premium is placed on avoiding further battles of this sort. The objective is to disrupt the victim's lines of communication and deny the defender time to reinforce weak points and regroup. The speed of the *blitzkrieg* denies the defender the capability to concentrate his forces for a second engagement. Follow-on units can deal with the isolated strong points that the leading units of the offence bypass. As the battle develops, the initial armoured thrust can be augmented by flanking movements and pincer squeezes, although the central element of the *blitzkrieg's* success is the deep strategic penetration. However, this success does not rest solely on putting an opponent at a physical

disadvantage. Psychological dislocation, which, of course, is a direct result of the defence's physical disadvantage, is the other pillar of success.

The revolution in precision-guidance has significantly enhanced the capability of a defence to thwart an offensive based on the *blitzkrieg*. Deterrence is enhanced because the number of weapon systems capable of destroying armoured vehicles has increased, and also because these systems are extremely accurate. In addition to using tanks and artillery, the defence can rely on shoulder-launched anti-tank guided missiles (ATGM); crew-served ATGM; helicopters and infantry-fighting vehicles equipped with ATGM; 'smart artillery'; and aircraft carrying a variety of 'smart bombs'. An attacking force that confronts a defender who has intelligently employed such weapons would have great difficulty making progress.

PGM present two problems for a *blitzkrieg* strategy. First, a mobile offensive requires the concentration of the enemy's armoured forces at a specific point(s) of attack to accomplish the initial breakthrough. Should the defender subsequently establish defensive lines, the attacking force would have to concentrate again to pierce them. Massing one's forces, however, is a dangerous tactic to use against an opponent armed with this growing arsenal of sophisticated anti-tank weapons. This is especially true in obstacle-ridden terrain where the attacking force is canalized. In this situation, only the offence's lead forces would be able to engage a defence armed with a plethora of lethal weapons. The remainder of the attacker's forces (the second and third echelons) would be unable to engage the defence directly – similar to naval forces that allow an opponent to 'cross the T'. Therefore, those few set-piece battles (especially the initial breakthrough) that the *blitzkrieg* has traditionally had to fight have become increasingly difficult to win. The great increase in fire-power resulting from the proliferation of new conventional weapons has raised the price that the offence must pay to pierce the defender's static front. Second, and more importantly, the notion of tanks pacing the attack, largely unsupported by infantry and artillery, is anachronistic in the face of a defence armed with PGM. The record of Israel's 190th Armoured Brigade in the 1973 Middle East War clearly demonstrates this

⁵ B. H. Liddell Hart, who, along with his British contemporary J. F. C. Fuller, was responsible for developing the theory behind the *blitzkrieg* in the 1920s, was arguing by the mid-1930s that a mobile defence could thwart a *blitzkrieg*. See B. H. Liddell Hart, *Europe in Arms* (London: Faber and Faber, 1937). In numerous publications after World War II, he provided extensive evidence to support his point that, even with the *blitzkrieg*, the relationship between the offence and the defence in World War II was not fundamentally different from that of World War I. For example, see chapters 10 and 11 in B. H. Liddell Hart, *Deterrent or Defence* (London: Stevens and Sons, 1960).

point.⁶ It is important to emphasize that historically the *blitzkrieg* has been propelled by armoured forces which did not have to concern themselves to any significant degree with supporting infantry and artillery. This does not mean that close co-ordination between the various combat arms was eschewed by practitioners of the *blitzkrieg*. Certainly, combined arms operations were necessary during the initial breakthrough and for subduing those defensive strongpoints which the main armoured force could not ignore. However, on the modern battlefield, the *blitzkrieg* will require armoured forces which are closely supported *at all times* by infantry and artillery. The tank is simply too vulnerable to operate unsupported, as it frequently did in the past.

Although the proliferation of systems capable of destroying tanks is the general cause of this development, the heart of the matter is the asymmetrical vulnerability of the tank and the individual soldier resulting from PGM. Before the revolution in conventional weaponry, the infantryman was a minor threat to the tank since anti-tank weapons like the 90 mm recoilless rifle were of limited value on the battlefield. Consequently, armoured columns driving deep into the defence's rear could virtually ignore pockets of infantrymen. Ensuing forces would deal with these threats. Now, however, tanks cannot ignore infantry strongpoints. Shoulder-launched ATGM like *Sagger* and *Dragon* as well as crew-served ATGM like *TOW* and *HOT* must be suppressed before the tank can advance. At the same time that the proliferation of extremely accurate weapons has done much to enhance the combat effectiveness of the infantryman, it has done little to increase his vulnerability. The PGM being deployed on the battlefield are designed primarily for use against weapon systems, not infantrymen. The same relationship obtains between the infantryman and an aircraft. An SA-7 or a *Stinger* represents a significant threat to an attacking aircraft, while a laser-guided *Maverick* missile is of little value against an infantryman.

The thrust of this argument should not be interpreted to mean that the battlefield of the future will feature a defensive force of PGM-armed infantrymen pitted against an offensive

force dominated by tanks and aircraft. Certainly, any successful defence against a *blitzkrieg* will require large numbers of tanks and aircraft, as well as some type of infantry fighting vehicle armed with a PGM, a matter which will be discussed later. The key point is that a *blitzkrieg* places a high premium on armoured vehicles moving forward at a rapid pace, without having to rely extensively on infantrymen for support. A defence, on the other hand, relies heavily on both infantry and armoured vehicles. Given that the ability of the individual soldier to 'kill' armoured vehicles has increased significantly but the ability of the tank, or any PGM-armed vehicle for that matter, to kill infantry has not increased correspondingly, the defence benefits. In his autobiography, Moshe Dayan explains how this asymmetry manifested itself in the 1973 War:

The principal combat factor was that in the north, most of the fighting took place with Syrian tanks on the attack and on the move, while our tanks were deployed in defensive positions. Thus . . . the Syrian *Sagger* anti-tank missiles had no special influence on the outcome of the battle.

This was not the case in the south. In the first two days, our tanks were on the attack, hurrying toward the Canal, while the Egyptians – primarily infantry equipped with anti-tank missiles – were in defensive emplacements. And indeed, our tank losses in the south were caused by the defensive Egyptian deployment.⁷

This development can be contrasted with another advance in conventional weaponry. Over the past decade, the ability of tanks to kill tanks with their main guns has increased notably. Since both the offence and the defence rely heavily on tanks in *blitzkrieg* warfare, it is impossible to say which side benefits from such a development. That is not the case with the PGM-armed infantrymen; they clearly strengthen the hand of the defence.

The defence against a *blitzkrieg* is further strengthened because PGM permit a reduction in the size of the force necessary to hold a particular defensive line against an attack (the force-to-space ratio). The increased fire-power available to the individual soldier, coupled with such

⁶ For a brief description, see Atkeson, *op. cit.*, p. 12.

⁷ Moshe Dayan, *Story of My Life* (London: Sphere Books, 1976), p. 516.

developments as smart artillery, reduces the number of troops required to hold a front and releases them for use in a mobile reserve or for deployment as part of a defence-in-depth.⁸ Other recent developments in conventional weapons technology which are not related to improved accuracy (improved conventional munitions, air-scatterable mines, fuel-air explosives, etc.), also contribute to the increased fire-power available to the defence and thus further lower the force-to-space ratio.

PGM clearly favour the defence when the offence is pursuing a *blitzkrieg*, thus making it increasingly difficult for an attacker to implement a *blitzkrieg* strategy. When an attack based on *blitzkrieg* principles fails, it evolves into a series of set-piece battles. As described earlier, this should work to enhance deterrence.

Rescuing the Blitzkrieg

A variety of arguments have been offered to rebut the claim that PGM have effectively eliminated the *blitzkrieg* as a viable military strategy. One frequently-mentioned panacea is increased co-ordination between armour and its sister branches – artillery and infantry. One analyst notes that 'infantry sweeps preceding armour may be a very effective means of dealing with a spread defence relying on PGMs'.⁹ This strategy has little redeeming value. First, World War I demonstrated that the machine-gun makes infantry sweeps prohibitive. The vulnerability of the exposed infantryman has been further increased by the development of sophisticated anti-personnel devices. Second, once infantry is placed in front of armour, the notion of *blitzkrieg* warfare disappears. The mobility and speed of one's armour is then dependent on the pace established by foot soldiers. At this point, it is necessary to consider whether these anti-personnel devices which are so effective against attacking infantrymen can also be employed against the defender's PGM-armed infantrymen with equal effectiveness. The answer is clearly no, and the basis for this conclusion is that the attacker must move forward while the defence can fight from fixed positions. Therefore, the attacker's infantrymen will be either standing or

at best in a prone position for limited periods of time, while the defender's infantrymen will probably be in protected positions, or at worst in a prone position. An infantryman in a standing position is much more vulnerable than one in a foxhole.¹⁰

A more realistic solution would be to facilitate close co-ordination between simultaneously advancing infantry and armour supported by artillery and air power. The US Army refers to such a force as the 'combined arms team'. However, this approach also has important limitations. First, a co-ordinated attack involving such a diversity of forces is a complex task. The co-ordination of artillery fire with advancing infantry and armour is especially complex since mobile artillery does not have the luxury of making extensive firing preparations and to be effective its fire must be laid down as close to the advancing troops as possible. Second, whereas *blitzkrieg* warfare requires relatively little logistical support, a campaign based on the sustained use of a combined arms team approach would require a good deal more support. There would be a need for more ammunition, especially artillery rounds, and for more POL since the number of vehicles necessary to transport the infantry, the artillery and the ammunition would increase. Third, the maximum range at which PGM can engage targets varies from 1,000 metres for *Dragon* to 3,000 metres for *TOW*. Infantry, advancing simultaneously with tanks and armed with rifles and machine-guns, would not be able to engage PGM-armed soldiers effectively until the distance between them was somewhat less than 500 yards. Obviously, the PGM force would be at a decisive advantage since it would have first draw in the fight. Fourth, and most important, the pace of the attack would be slowed since tanks would still be consigned to keeping pace with advancing infantry. If heavy reliance was placed on artillery, the time spent preparing for and engaging in artillery exchanges would further hinder the rate of advance. On a battlefield ridden with sophisticated tank-killing systems, slowing down the speed, and therefore increasing the

⁸ For an excellent discussion of how the force-to-space ratio has been decreasing, see Liddell Hart, *Deterrent or Defence*, *op. cit.*, chapter 10.

⁹ Foster, *op. cit.* in note 3, p. 10.

¹⁰ For example, *Army Field Manual 100-5* states 'Individual foxholes provide a 10-fold or greater reduction in casualties against impact fuzed artillery ammunition'. *Operations: FM 100-5* (Washington DC: Department of the Army, 1 July 1976), pp. 3-12.

exposure time of the tank, is clearly most undesirable.¹¹

To combat the slowness and vulnerability of the dismounted infantryman, armoured personnel carriers (APC) have been developed and deployed. The objective is to develop a balanced attacking force using mechanized infantry that can keep pace with tanks and dismount only when necessary. These personnel carriers, which usually carry a squad of soldiers, are becoming increasingly sophisticated. They no longer are being designed merely to transport troops from point A to point B, but instead are being designed with enough fire-power, mobility and armour-plating to function as an 'infantry fighting vehicle' (IFV). This means that an infantry squad can conduct combat operations without dismounting. The Soviet Union began developing IFV and integrating them into her force structure well before the United States began actively pursuing the idea. The Soviet BMP, which is equipped with a 73 mm gun, an ATGM system and a coaxial 7.62 mm machine-gun, was originally designed to operate on a nuclear battlefield, where it was expected to exploit the many offensive opportunities resulting from the use of nuclear weapons. Although the BMP is relatively thin-skinned (it was not intended for use against fixed positions), it is an integral part of Soviet strategy for a non-nuclear war.

However, evidence from the 1973 Middle East War indicates that IFV are very vulnerable on a battlefield dense with accurate anti-tank weapons.¹² This is basically the result of its armour, which is not as thick as the armour on a tank. An added disadvantage for the IFV is that a direct hit would probably result in the elimination of an entire infantry squad. Very importantly, the implications of the IFV's vulnerability

are different for the offence and the defence. Since an offensive force must move forward and since there are limits on the amount of protection afforded an attacker by the terrain, the attacking IFV will be very vulnerable to enemy fire. (This situation is the cause of Soviet concern.) As such, the IFV is of questionable value to the offence. It would make sense for an attacker to eschew the IFV concept and instead procure more tanks and build cheap APC that simply transport infantry from point A to point B.

However, because a defensive force usually fights from fixed positions, it is possible for an IFV to use man-made or natural obstacles for protection. Although this will not mean total invulnerability, an IFV's survivability is certainly greater in a defensive position than when it is rolling forward in the open as part of a strike force. This circumstance is to be welcomed because an IFV can significantly strengthen a defence. First, a defensive force on the modern battlefield will have to be mobile. Given the large size of PGM like *TOW*, it is necessary to mount a proportion of such weapons on mobile platforms. An IFV provides the capability to transport *TOW*s as well as infantrymen carrying shoulder-launched PGM. Second, an IFV affords infantrymen and mounted PGM a degree of protection when the attacker employs anti-personnel devices like artillery. The importance of this service cannot be exaggerated since an attacking force will undoubtedly use artillery, fuel-air explosives and other weapons to suppress infantrymen who threaten tanks. Clearly, the IFV favours the defence and not the attacking force. However, two caveats must be considered. First, a defence will be required to counter-attack – to go on the offensive – from time to time. In such instances, the value of the IFV to the defence becomes questionable. Second, in battles where the defence is not allowed to fight from fixed positions, battles where there is little distinction between offence and defence, the IFV is of little value to either side. In general, the IFV is a stabilizing system because it benefits the defence more than the offence.

The most serious threat to PGM is the development of 'special armour' or what is referred to in the West as 'Chobham armour'. Reports indicate that Chobham provides a three-fold increase in protection over conventional steel armour and that there is presently no PGM – Soviet or

¹¹ It is interesting to note that, as a result of PGM, for the defence, there is now less need for the infantry to rely on armoured forces for support, since infantry now have the capability to engage tanks; while for the offence, greater emphasis is being placed on integrated operations to deal with PGM-armed infantrymen.

¹² This development has been a cause of great concern for Soviet defence specialists. Phillip Karber writes that the Soviet Union 'had previously assessed APC to be twice as vulnerable as tanks. Apparently, in exercises and field tests since the Middle East War, the army has found that BMP is even more vulnerable to the new generation of anti-tank weapons than was previously believed'. Phillip A. Karber, 'The Soviet Anti-Tank Debate', *Survival*, May/June 1976, p. 108.

American – that can penetrate it.¹³ Although there is no reason to doubt these reports, there are problems associated with this new technology. First, it is very expensive and, therefore, the number of armoured vehicles that can be outfitted with Chobham is limited. (Britain could not afford to incorporate Chobham into her *Chieftain* tanks.) For the foreseeable future, it seems highly unlikely that IFVs will be equipped with the new armour, and it would not be surprising if only a portion of a nation's tank force was protected by Chobham. Survivability has an expensive price tag. Second, although there are rumours that the new Soviet tank (T-80) might have special armour, all evidence indicates that the Soviet Union is behind the West in developing and deploying this technology. It will take a considerable amount of time for the Soviet Union to equip a significant portion of the Warsaw Pact's huge tank inventory with special armour. Third, while special armour is being developed and deployed, advances are being made in ATGM technology. Many of those systems used so effectively in Vietnam and in the recent Middle East War are essentially first-generation weapons. They represent the cutting edge of the PGM revolution. Future versions will be designed with Chobham armour in mind. Importantly, the speed at which technological innovations are incorporated into new generations of weapons favours the PGM over the tank. This is a result of the tank's greater complexity, which gives rise to technical problems and also tends to attract the kind of attention that inevitably results in a protracted development process. Although no one can predict developments in weaponry with great accuracy, there is no reason to believe that the effectiveness of PGM has been largely nullified by advances in armour protection.

However, should the balance continue to shift in favour of special armour, the battlefield equation would be significantly affected. The only PGM that would be capable of penetrating special armour would be the larger ones – like *Hellfire*. Shoulder-launched PGM and even crew-served PGM like *TOW* would be largely ineffective against vehicles equipped with special armour. Obviously, the value to the defence of such infantry-borne PGM will be inversely proportional

to the number of special armour-equipped vehicles in the attacking force. If the trend is towards larger PGM, they will have to be mounted on IFV or some other mobile platform. As pointed out earlier, such a development certainly benefits the defence and not the offence. However, this does not negate the fact that the elimination of PGM-armed infantrymen as a key force on the battlefield would be detrimental to the defence. In general, it seems likely if advances in PGM technology are not forthcoming (other than to increase the size of the missile), the offence-defence equation will shift back towards the offence.

Given the rapidly escalating cost of increasingly vulnerable tanks, some argue that instead of procuring a limited number of expensive and sophisticated tanks, it would make more sense to deploy greater numbers of less expensive and less sophisticated tanks.¹⁴ There are problems with this. First, inexpensive tanks are very vulnerable, and it is doubtful whether enough extra tanks could be procured to offset the higher losses that would result from the increased vulnerability of such an armoured force. The cost-exchange ratio between tanks and PGM clearly favours the latter. Second, the true cost of a tank force cannot be measured simply by multiplying the number of tanks by the hardware cost per tank. Tanks require manpower, and in North Atlantic Treaty Organization (NATO) countries at least, the cost of additional tank crews makes it very difficult to increase the size of one's armoured force. The British Army of the Rhine had to place approximately 50 *Chieftain* tanks in storage because they did not have the crews to operate them.¹⁵ It is highly unlikely that the trend will be towards larger numbers of cheaper and less sophisticated tanks – for either NATO or the Warsaw Pact.¹⁶ However, if the trend does go in that direction, it will certainly not threaten the utility of PGM like *TOW* and *Dragon*.

¹⁴ For example, see 'Critical Considerations in the Acquisition of a New Main Battle Tank', report prepared by the General Accounting Office, PSAD-76-113A, 22 July 1976.

¹⁵ 'Rearming Without Tears', *The Economist*, Vol. 268, No. 7042 (19 August 1978), pp. 10–11.

¹⁶ As a result of her war experience, Israel has concluded that it is premature to deploy well-protected tanks. See Merkava Mk 1', *International Defense Review*, Vol. 11, No. 7 (1978), pp. 1049–1052.

¹³ Richard Ogorkiewicz, 'Tanks and Anti-Tank Weapons', in Adelphi Paper No. 144 (London: IISS, 1978), pp. 38–44.

Responding to the IFV's vulnerability problem, some will undoubtedly argue for placing special armour on the IFV and effectively turning it into a tank with a missile instead of a gun. There is little utility in such a scheme since it is widely recognized that, for a variety of reasons, tanks should be equipped with guns, not missiles.¹⁷ For the defence, the attraction of an IFV equipped with a PGM is its inexpensiveness relative to the cost of the tank. (These two systems also complement each other nicely.) Placing special armour on the IFV would effectively raise the price of an IFV to a level commensurate with the cost of a tank. The key assumption is that the protection the terrain affords the defender will compensate for the IFV's vulnerability. When the defence is forced to go on the offensive, primary reliance will be placed on the tank force. If there is a requirement for either the offence or the defence to increase its offensive punch, it would be more feasible to build additional tanks rather than place special armour on IFV. This is especially true when one considers the limited resources available to purchase armoured vehicles.

Some analysts argue that the attacker can negate the effectiveness of PGM by resorting to night attacks. There is abundant evidence that Soviet forces are well-trained in night operations.¹⁸ However, there are problems with this approach. First, although it might be possible to achieve certain limited objectives with night attacks, it is hard to imagine the Soviet or any other military force inflicting total defeat on an opponent by relying exclusively on night attacks. The problems of co-ordination and poor visibility make such a strategy highly questionable. Furthermore, the assumption that PGM are ineffective in the dark because they cannot see the target is dubious. The United States is developing thermal-imaging night sights which will allow *Dragon*, *TOW* and *Maverick* to pinpoint targets in the dark. Finally, there is no reason why American forces, or any defensive force for that matter, cannot be trained to fight at night. There is nothing inherent in night fighting which favours the offence.

PGM and the Air-to-Ground Balance

Both the German and Israeli *blitzkriege* relied heavily on close air support instead of land-based artillery for fire-power. Of course, the defence can use close air support to help thwart an armoured offensive. For both the defence and the offence the extent to which each side can rely on close air support depends on who has air superiority.

The deployment of air-to-ground PGM like the *Maverick* has greatly increased the combat effectiveness of close air support aircraft. At the same time, the effectiveness of ground-based air defence systems like SAM and air defence guns has also increased. In addition to evolutionary improvements in systems like *Hawk*, the SA-2 and the SA-3, new systems such as the highly mobile SA-6 and the shoulder-launched *Stinger* have appeared on the battlefield. The deployment of radar-controlled air defence guns like the ZSU/23/4 has further complicated the survivability problem for aircraft operating above the battlefield.

In providing punch for the offence, ground attack aircraft would be the ideal weapon, while the SAM and air defence guns would be used to protect the offensive force from the defender's ground attack aircraft. A *blitzkrieg* which confronts a defence that has neither an effective ground-based air defence system nor fighter aircraft could take maximum advantage of its ground attack aircraft. Conversely, ground attack aircraft that encounter a defence that has a belt of SAM and air defence guns, as well as a reliable fighter force, would have considerable difficulty assisting the advancing armour columns. The 1973 Middle East War demonstrated that a sophisticated air defence belt can exact a heavy price from attacking aircraft. Before the proliferation of mobile and accurate SAM and air defence guns, the defence had to rely on its fighter force and ground-based electronic counter-measures to counter the attacker's 'flying artillery'. Now it is possible for a defender, with no aircraft to speak of, to parry attack aircraft with SAM and air defence guns. Attacking aircraft confronting a defence that has both a potent fighter force and a sophisticated air defence belt would be largely ineffective. In such cases, the *blitzkrieg's* fire-power would have to be provided by land-based artillery.

An offensive force which has a well-integrated and mobile system of SAM and air defence guns

¹⁷ Ogorkiewicz, *op. cit.* in note 13, p. 40.

¹⁸ See Captain Eugene D. B  tit, 'Soviet Technological Preparations for Night Attack', *Military Review*, Vol. LV, No. 3 (March 1975), pp. 89-93.

would be well-suited to deal with a defence that relies heavily on ground attack aircraft. This is why there is so much concern among American policy-makers over the A-10, which is designed to deal with the cutting edge of the Soviet *blitzkrieg*. Of course, the problem that the offence encounters when it relies on ground-based systems to counter the defence's attack aircraft is that the size of the offensive force and its accompanying logistical tail increases.

What effect do these developments have on the offence-defence equation as it applies to the *blitzkrieg*? Assuming that the proliferation of the new conventional weapons technologies continues and that both the offence and the defence have ground-based air defence systems and close air support aircraft, the *blitzkrieg's* chances for success will be further complicated. First, when the defence deploys an extensive network of SAM and air defence guns, it becomes increasingly difficult for the offence to rely on close air support. This means that the main source of fire-power will have to be artillery.¹⁹ This development is much more detrimental to the offence than the defence because it creates logistical problems which will work to slow the *blitzkrieg* and lead to set-piece battles. Second, the offence's reliance on SAM and air defence guns also creates significant logistical problems, which add to those logistical demands resulting from an increased reliance on artillery. Furthermore, the pace of the attacking armoured columns could be slowed since it is imperative that these forces do not outrun their air defence systems. This problem could be obviated by relying on fighter aircraft to provide air defence for the offensive forces and abandoning reliance on a ground-based air defence. For a variety of reasons, this does not appear to be the direction in which the major military establishments are moving. Third, in those instances where attack aircraft are able to bring their *Mavericks* and other sophisticated weapons to bear, the key problem will be target acquisition. This will be an especially acute problem on the European battlefield where visibility is limited during long

periods of the year. The problem of target acquisition is more serious for the attacker's aircraft since the defence will be, for the most part, fighting from fixed positions. The offence, because it must abandon cover and move forward, will provide greater targets of opportunity for the defender's attack aircraft. Evidence indicates that the advances in weapons technology relating to the air-to-ground balance will contribute to the defender's capability to thwart the *blitzkrieg*.

Conclusion

As a result of the revolution in precision-guided technologies, it is much more difficult to implement a *blitzkrieg* strategy. To adjust to the proliferation of these weapons, the offence has been forced to increase the mass of his attacking force. An offensive must now place heavy reliance on artillery, SAM, air defence guns and mechanized infantry. The tank-dominated offensive, which relied on ground attack aircraft for fire-power support, has no place on the modern battlefield. The new emphasis on combined arms operations creates severe logistical problems as well as myriad problems of battlefield co-ordination, both of which rob the *blitzkrieg* of mobility and speed. The increased reliance that the offence is forced to place on artillery, to counter a defence depending on PGM, also contributes to the demise of *blitzkrieg* warfare. It is imperative to emphasize that the fundamental question is not whether PGM can be dealt with by an attacker, but instead, what changes in offensive strategy are necessary to overcome these weapons.

At the same time that PGM have compounded the attacker's problems, they have worked to benefit the defence. The increased fire-power available to the defence makes it possible to turn each major defensive position into a 'wall of fire' that the offence can penetrate only by paying an exceedingly high cost.²⁰ If a potential

¹⁹ Since the 1973 war Israel, who up to now has relied heavily on close air support for offensive purposes, has significantly increased the artillery in her army. See Martin van Creveld, 'Two Years After: the Israel Defence Forces, 1973-75', *RUSI*, Vol. 121, No. 1 (March 1976), pp. 29-34.

²⁰ Regarding increased fire-power resulting from the proliferation of PGM, Mohamed Heikal writes concerning the 1973 Egyptian attack: 'It was this last-minute "overdose" of weapons (extra *Strellas* and *Suggers* given to the assault forces) that enabled the infantry to hold out, and General Dayan was later to admit that it was not so much the novelty of the weapons that took the Israelis by surprise as the sheer numbers in which they were available to the Egyptians at the outset of the battle'. Mohamed Heikal, *The Road to Ramadan* (New York: Ballantine Books, 1975), p. 6.

attacker perceives that using a *blitzkrieg* will evolve into a chain of set-piece battles, he will be very reluctant to initiate hostilities.

In practice, a large-scale offensive, be it a *blitzkrieg* or a strategy based on simply wearing the opposition down, is never purely offensive in nature. Any attack involves some combination of offence and defence. In those cases where the objective is to inflict total military defeat on an opponent, the attacking force is primarily concerned with the offensive ingredient. The *blitzkrieg* is such a strategy. However, when an attacker has limited aims, which would most likely involve the capture of some portion of an opponent's territory, defensive tactics assume much greater importance for the attacker. After a quick offensive surge, the attack moves to the defence and prepares for the opposition to counter-attack. The attacker uses the natural advantages that accrue to the defence, which are augmented by the proliferation of PGM. The victim, should he choose to launch a counter-attack, would be forced to attack a well-fortified and alert defence.

An offensive with limited objectives will undoubtedly attempt to utilize the element of surprise to achieve its objective before the defence has the opportunity to establish the 'wall of fire' described above. For the offence, surprise is a key means of dealing with PGM. Although surprise can provide the key to success in such limited operations, it should be emphasized that there are significant limits to the benefits one can expect to derive from surprise when the objective is total defeat of the opponent's armed forces. A defence that is versed in the fundamentals of mobile armoured warfare (unlike the Allies in 1940 and Egypt in 1967) will effectively halt any initial successes achieved by surprise.

The limited offensive stands in marked contrast to the *blitzkrieg* as a strategy which stands to benefit from PGM. The implications of this development are significant. Consider two examples.

In the Middle East, the value of an offensive based on limited objectives was clearly demonstrated by Egypt in the 1973 War. Israel suffered heavy losses in the first period of the war when she attacked solid Egyptian defences. It was only after Egypt abandoned this strategy on 14 October and launched an offensive that her position began to deteriorate. Even then, the

margin between Israel's ultimate success and possible failure was precariously narrow. For Israel, who relies on a reserve army, the possibility of the Arabs achieving surprise and capturing some territory before the Israeli Defence Force can mobilize remains a real threat. Should an Arab state successfully pursue such a strategy, then Israel, who has traditionally relied on armour instead of infantry, must deal with a PGM-armed defence that is ideally suited to counter armour-heavy forces.

One would think that because NATO's defensive strategy is based on the concept of forward defence (i.e. thwarting a Warsaw Pact attack right at the border between East and West Germany), NATO's forces would be ideally positioned to deal with an offensive based on limited objectives. However, the majority of NATO's forces are located in peacetime well to the west of their defensive positions. Consequently, they will have to be alerted and then deployed to their forward positions in a time of crisis. In a crisis, however, NATO will be very reluctant to move its forces forward, since such a move could easily be interpreted as offensive in nature by the Warsaw Pact. This might trigger a Warsaw Pact attack that otherwise would not have taken place. On the other hand, if the Warsaw Pact believes that military action is inevitable, regardless of any NATO provocation, and they choose to pursue limited military objectives (an attractive alternative given the growing complications associated with the *blitzkrieg* and the Soviet aversion to engaging in a slugging match reminiscent of World War II), they have a vested interest in attacking before NATO can establish its 'wall of fire'. This means that in a crisis the Warsaw Pact will have an incentive to strike quickly – a destabilizing situation. NATO's best prospect for deterring such a limited strike is to deploy rapidly to the forward defensive positions. Unfortunately, it is very unlikely that NATO will know whether or not the Warsaw Pact is planning an offensive. Therefore, by moving towards the border, NATO runs the risk of provoking an attack – in those circumstances where the Warsaw Pact was not predisposed to launch an offensive.

In conclusion, although PGM have greatly enhanced the defence's capability to thwart a *blitzkrieg*, new problems have arisen regarding an offensive based on limited objectives.