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Leopard Tanks and the Deadly Dilemmas of the Canadian Mission in Afghanistan

By Michael Wallace

Summary

At the end of September 2006, the Department of National Defence (DND) began to deploy a contingent of 15 of Canada's 28-year-old Leopard 1 C2 tanks to the battlefield in Afghanistan.¹ Three years previously, DND claimed that the Leopards were "obsolete" and would soon be replaced by 66 U.S.-designed Stryker armoured vehicles at a cost of US\$460 million.² The rationale for this abrupt reversal was the vulnerability of Canadian light armoured vehicles to attack, most notably by the now-infamous "improvised explosive devices" (IEDs), more simply named booby traps and anti-tank mines. The Leopards, it was argued, provided more protection for Canadian soldiers, while their 105-mm main armament provided superior striking power in battle.

On closer analysis, this deployment was wrong-headed for two fundamental reasons. First, these tanks are themselves vulnerable to a variety of weapons easily obtained or manufactured by insurgent forces. Second, their deployment is part of a growing trend toward a *blitzkrieg* form of combat in Afghanistan that resembles the all-out warfare of the U.S.-led "Operation Enduring Freedom." Thus, it is incompatible with the spirit of the civilian reconstruction mission envisaged by NATO in authorizing the International Security Assistance Force (ISAF).

The Vulnerability of the Leopard Tank

It is a truism that even the most modern armoured vehicles, including main battle tanks (MBTs), are almost totally helpless when deployed alone against advanced anti-tank missile systems, and even rocket-propelled grenades (RPGs). During the Israeli incursion into Lebanon in the summer of 2006, Israel's Merkava tanks—perhaps the most powerful and safest in the world³—proved vulnerable to the advanced Soviet anti-tank missiles used by Hezbollah forces,⁴ such as the Russian-made AT-13 (METIS-M).⁵ The Merkavas were also vulnerable to advanced Soviet RPG-29 rocket-propelled grenades (VAMPIR).⁶

Leopard 1 C2's Vulnerability to RPGs

Older-model tanks such as the Leopard 1 are even more vulnerable. An RPG-29 uses a tandem shaped-charge warhead⁷ capable of penetrating as much as a metre of modern reactive armour,⁸ and can be fired from concealment at a range of up to 1.5 km. (It can also be aimed upward to attack helicopters, as the Americans have found to their cost in Iraq). In other words, concealed insurgents so equipped could destroy a Canadian Leopard 1 C2 with a single shot, quite literally before its crew knew what hit it. Since the RPG-29, like the older RPG-7, is infantry-portable, the light and mobile insurgent forces operating in Afghanistan should have no trouble deploying it in battle.

It may be questioned whether such a relatively modern weapon would be available to the Afghan insurgents. It was developed by the Soviet Union in the 1980s to defeat the reactive armour developed for the upgraded American Abrams M1A1 and M1A2,⁹ and the end of the Cold War delayed its deployment until 1992. Yet Russian officials, speaking anonymously, admit that the RPG-29, along with many other former Soviet advanced weapons systems, have found their way onto the global black market.¹⁰ And if the unconfirmed but persistent reports that the Afghan insurgents are being aided by elements of the Pakistan Secret Service (ISI) are correct,¹¹ it is possible that these insurgents have acquired RPG-29s. Military planners, who traditionally make their preparations based on worst-case scenarios, surely must assume that they have.

But even much older rocket-propelled grenades, principally the infamous and ubiquitous RPG-7, represent a serious threat to tanks of the Leopard's generation and weight (about 40–42 tonnes, depending on armour configuration¹²). These types of grenades have even successfully attacked American M1A1 tanks, which are as large and have far thicker

and more sophisticated armour than Leopards.¹³ Made notorious by the movie *Blackhawk Down*, the RPG-7 is a veteran of insurgent battles from Vietnam to the struggle of the Afghan mujahideen against the Red Army.¹⁴ A recently declassified U.S. army training manual discusses the RPG-7's threat to armoured vehicles in considerable detail.¹⁵

Although the RPG-7 must be fired at almost point-blank range to be effective (300 metres or less),¹⁶ it is almost impossible for a target tank to react, since the shaped-charge projectile hits its target in as little as one or two seconds.¹⁷ Under ideal conditions at a range of 250 metres, a gunner will hit a stationary target within a second of launch, and has about a 50 per cent chance of making a hit.¹⁸ If he misses, he can reload and fire again with compensated accuracy in less than 15 seconds, giving the target little time to react.¹⁹ When multiple launchers are used, the target's chances are dramatically reduced, so trained fighters are taught various ways to create crossfire ambushes.²⁰

The armour of a Leopard 1 C2 is often able to survive an RPG-7 direct hit if the grenade hits one of the more



A Canadian Leopard 1 C2 in Afghanistan. (Photo: DND)

heavily protected areas, such as the front of the main turret.²¹ But if a round disables the relatively vulnerable treads, the tank is helpless against continuing fire, as one of the important countermeasures suggested in the army manual is to “keep moving.”²²

Classic countermeasures are to target the gunner with the tank’s secondary armament, usually a heavy machine gun,²³ and to provide infantry covering fire against observed or probable RPG emplacements.²⁴ These measures have two disadvantages. First, the purpose of introducing the Leopard tanks was to provide protection for lightly armoured vehicles and infantry. In an RPG attack, to protect the tanks the infantry must enter well-defended enemy positions, increasing rather than reducing the probability of casualties. Second, if the RPG attack is launched from a built-up area, a counterattack will result in a high rate of civilian casualties, making the stated ISAF mission (discussed more fully below) far more difficult.

Finally, of course, there is air power, which has been used extensively in all phases of the ISAF mission. NATO has relied extensively on “close air support” to attack insurgent positions. Although details are not publicized, an indication of the intensity of the fighting is that in June 2006, the United States Central Command reported that it had flown 340 air strikes in Afghanistan, more than twice the 160 carried out in Iraq.²⁵ But despite the heavy use of air power, news reports suggest that the insurgency has not diminished,²⁶ and that civilian casualties have increased dramatically.²⁷ Although a general debate over the use of air power is outside the scope of this paper, it seems unlikely that it can be used effectively to protect the Leopard tanks, even at the cost of civilian casualties. In the words of a former Soviet tank officer, “Constricted terrain [such as] population centres...leads to close combat. When the combatants are [only a few] metres apart, artillery and air support is practically nonexistent due to the danger of fratricide. Close combat is a direct-fire brawl in which the RPG-7 excels.”²⁸

From a broader perspective, introducing 28-year-old tanks into a combat zone replete with effective anti-tank weapons against fighters with nearly three decades of experience in attacking and killing far superior armour does not, on the face of it, seem such a wise decision. But even if the RPG threat could somehow be neutralized without extensive civilian

casualties, there are other and equally nasty surprises awaiting the Leopards.

Improvised Explosive Devices and Anti-tank Mines

Perhaps the most frequently encountered threat to NATO vehicles of any sort in Afghanistan are the improvised explosive devices (IEDs) made infamous by the war in Iraq. Their purpose is to destroy or disable an armoured vehicle using an explosive charge buried in or at the side of the road. They are triggered by remote control, tripwire, or pressure of the vehicle passing over them. The effectiveness of IEDs lies in:

- a) the variety of materials from which they can be constructed;
- b) the availability of these materials in insurgent territory, most notably Iraq and Afghanistan;²⁹
- c) the relative lack of expertise required to make them;
- d) the ease with which this experience is acquired and upgraded;
- e) the frequency with which IEDs are able to destroy or disable their targets, leading to a relatively high and increasing rate of military casualties, and the simultaneous increase in the tempo of operations and the skills of the insurgents.³⁰

That the Canadian Leopard 1 C2 tanks are vulnerable to IEDs is beyond question. In Iraq, insurgents have used them successfully against American armoured vehicles, accounting for about one-third of American fatalities in that country.³¹ Properly constructed, they can defeat even MBTs.³²

An IED typically consists of an explosive charge, a detonator, and an initiation mechanism. In Afghanistan, crude IEDs have been made from surplus artillery shells encased in rock or cement, with a plate on top to detonate the fuse when a vehicle rolls over it. When available, additional high-velocity explosive such as Semtex or C-4 is packed around the shell to boost the explosive effect. Other types of IED may be constructed from raw explosive confined by metal or rock, and detonated remotely by such diverse means as VCR timers, tripwires, cell phones, or garage door openers.

By the end of the Soviet occupation, the Afghan fighters had already achieved a level of experience and skill in IED construction comparable to that of the current Iraqi militias. Sometimes the insurgents removed the explosives from foreign anti-personnel mines or dud artillery shells (UXO) and combined them to achieve a blast effect many times greater than the original ordinance. Equally important, they devised techniques to avoid detection of the device; even something as simple as encasing it in plastic was very effective.

As in Iraq today, Afghan fighters also learned to make even more sophisticated IEDs by using modified shaped charges, sometimes known as explosively formed penetrators (EFPs),³³ which are effective in ranges of up to 50 metres from the target. EFPs are made by packing high-velocity explosives into a cylinder with a conical metal cover. When detonated, the explosives deform the metal cover into a projectile with a velocity of up to 2,000 metres per second that can penetrate the crew compartment from below or blow off the treads to immobilize the vehicle." Very effective against light armour, EFPs can also disable or destroy MBTs if a lucky shot hits a vulnerable part of the armour. Modern battle tanks such as the Abrams have thus far provided protection against them, but the number, sophistication, and penetrating power of EFPs has been increasing in Iraq, leading to a sharp increase in the number of U.S. casualties from attacks on armoured vehicles by the end of 2006.³⁴ Without a doubt, EFPs represent a serious threat to the 28-year-old Canadian Leopard 1 C2s.

But no IED poses a threat more serious than modern anti-tank mines, which were effective in Afghanistan even against the modern, well-armoured Soviet tanks such as the T-72 and the T-80.³⁵ Modern Western anti-tank mines were available in quantity to the Afghan fighters, particularly in areas near the Pakistani border. Numerous types from various countries were used.³⁶ One of the most effective models was the Italian TC-6.³⁷ About half the size of a curling stone, the TC-6's 7-kg charge of TNT could "flip a [Soviet tank] the way a seagull flips a baby turtle."³⁸ In addition, the TC-6 and similar advanced anti-tank mines are very hard to detect because they have no more metal content than a spent cartridge.

It would be naïve to assume that stores of these and similar mines are not still hidden in the tribal areas of

neighbouring Pakistan, or indeed that sympathetic elements in the ISI would not be able to supply them if needed. Operating again from worst case assumptions, we must assume the possible existence of a modern, sophisticated anti-tank mine threat to our Leopards.

In sum, the number and potential severity of the risks of putting our 1960s-designed Leopard 1 C2 tanks in harm's way surely outweighs any additional protection they can supply to Canadian Forces in Afghanistan. DND has clearly woken up to the risks involved, and as a consequence has begun negotiations with the Germans to lease or purchase 20 or more modern Leopard 2 A6M tanks.³⁹

The Leopard 2 A6M

The advantages of such a course are obvious. Virtually every NATO country except the United States has standardized on some variant of the Leopard 2,⁴⁰ which is generally considered one of the best battle tanks in the world. Weighing 55 tonnes, equipped with a 120-mm gun as its main armament, and as heavily armoured as an American Abrams,⁴¹ the Leopard 2 A6M is an impressive-looking machine indeed.⁴² It has the advantage over the Abrams of using a diesel engine rather than a gas turbine, which simplifies maintenance and conserves fuel. Moreover, the M model has additional armour plate on the underside to protect against anti-tank mines.⁴³ The German and Dutch armies rely exclusively on the Leopard 2 A6 for situations requiring forward deployment of armour. So, without a doubt, the substitution of Leopard 2 A6Ms for Canada's current Leopard 1 C2s will provide a good measure of additional protection for their crews. *But, as cannot be overemphasized, even the most modern and capable tanks are vulnerable to a variety of attacks, and the Leopard 2 A6Ms, for all of their formidable statistics, have never been tested in the brutal conditions of Middle Eastern battle.* With this in mind, let's review the threats to the Leopard 1 C2s outlined above as they apply to the newer Leopard 2 A6Ms.

RPGs

If the Israeli Merkava, with seven additional tonnes over the Leopard 2 of armour in special shaped modules⁴⁴ was still defeated by RPG attacks, then the Leopard 2 will be vulnerable as well, and if Abrams MBTs can be destroyed by well-coordinated RPG-7 attacks,⁴⁵ then the Leopard 2s are no less vulnerable. This is

particularly true if, as in Iraq, training and tactics improve with time, and access to more modern RPGs (such as the RPG-29s used in Lebanon) becomes more widespread. The cost of the additional protection built into the Leopard 2 vastly exceeds that of the additional RPGs required to defeat it, given improved training and tactics as the conflict continues. This is surely a classic case of asymmetrical warfare.

IEDs and Anti-tank Mines

The extra armour plates under the crew compartments of the Leopard 2 A6Ms will no doubt defeat many more IED and anti-tank mine attacks than would be the case with the Leopard 1 C2s.⁴⁶ Note, however, that while tests show that this additional armour will reduce crew casualties in the initial explosion, chances are high that the tank will be immobilized, subjecting it to further coordinated attack. Learning again from the experience in Iraq, the insurgent response to “up-armouring” will simply be to increase the amount of explosive in the device (or rig their fuses in tandem) and follow IED attacks with RPGs.

For three years, the American forces in Iraq have failed to neutralize the threat—and casualties—from IEDs. In their embarrassment, they now seek to put the blame on sophisticated EFP technology imported from Iran,⁴⁷ despite the obviously homemade appearance⁴⁸ of the



A rocket propelled grenade (RPG-7).



An American M1A1 main battle tank destroyed in Iraq by RPG fire.

devices and the ease of obtaining materials to make them—high grade steel pipe from an oil refinery, a large quantity of military explosives, and a cast copper concave top made from melted wire will make an excellent EFP.⁴⁹ And—most ludicrous of all—the basic principles of their construction and operation can be obtained from a U.S. Air Force web site!⁵⁰ Again, asymmetrical warfare at its most effective.

Finally, one may question the usefulness of large main battle tanks in the Afghan theatre on tactical grounds. Tanks are designed to dominate the battlefield in the open, laying down brutal fire against a concentrated, identifiable enemy. If the terrain forces them to fight in close quarters, their effectiveness is significantly reduced. Moreover, as the Soviets discovered in Afghanistan, and the Americans again in Iraq, if insurgent forces attack armour primarily by setting booby traps (IEDs and EFPs), and use small groups to launch direct assaults—frequently in the midst of populated areas—then MBTs cannot easily defend themselves or counterattack without risking significant civilian casualties. This leads to a broader question about the nature of the mission itself.

The ISAF Mission: On the Horns of a Dilemma

The Canadian government website devoted to the Afghanistan⁵¹ outlining the official view of Canada’s ISAF mission, emphasizes the need to defeat the insurgent opponents of the official Afghan government, while at the same time stressing the mission goals of extending the rule of law, human rights, and economic development. In effect, Canadian Forces are fighting a war while civilian personnel seek to rebuild the country with the cooperation of Afghans. The dilemma is that to fight the war effectively and minimize NATO casualties, ISAF forces have increasingly resorted to weapons and tactics that alienate the Afghan population from those who have travelled far and are risking much to pursue the well-being of the Afghan people. The worst offender in this respect, as noted above, is almost certainly the increased use of air power, with its inevitable toll in civilian casualties and friendly fire incidents. The magnitude of this specific problem is beyond the scope of this paper, but the deployment of main battle tanks by the Canadian Forces is symptomatic of the same dilemma. How are regional development teams likely to be perceived if they are preceded by a 55-tonne mechanical monster that could pulverize their village with a single shot?

And, how can Canada set its sights on human rights, reconstruction, and economic development if its view of the country is narrowed to the turret sight of a tank?

It is entirely understandable that our military commanders will exert every effort to minimize the loss of Canadian lives, but by doing so they risk further alienating a suspicious population that has had no reason to embrace foreigners. Stripping away the optimistic rhetoric, the ISAF mission finds itself on the horns of this dilemma. And, to quote a Russian saying, “the two horns of a dilemma are usually attached to the same bull.” For the last four centuries, invading powers—the Sikhs, the British, the Soviets, and the Americans, in succession—have attempted to change Pushtun society by force, and failed. Their clan society, in Kipling’s words, has been “the killer of empires.” As in Greek tragedy, *hubris* is followed by *nemesis*, which, after all, is only a fancier way of saying “look before you leap.”

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Notes

1 There have been numerous variants of the German Leopard tank manufactured over a period of nearly four decades. For clarification, the current Leopard tanks in the Canadian Forces are an upgraded, C2 variant, of the original Leopard 1, designated the Leopard 1 C2. The version the Canadian Forces hope to acquire is a variant of the later Leopard 2, designated the A6M variant, or Leopard 2 A6M.

2 Reuters, October 29, 2003

3 For details on the Merkava, see <http://www.globalsecurity.org/military/world/israel/merkava.htm> .

4 The Russians, of course, vehemently deny that they were responsible for the presence of RPG-29s on the battlefield, either directly or indirectly via Syria: <http://www.bintjbeil.com/articles/2006/en/rpg29.html> .

5 <http://www.fas.org/man/dod-101/sys/land/row/at-7.htm> .

6 Worldwide Equipment Guide (OPFOR), Threat Support Directorate, U.S. Department of Defense, Washington: 2001, p. I-14 (hereafter cited as WEG).

7 <http://www.globalsecurity.org/military/systems/munitions/bullets2-shaped-charge.htm>

8 <http://www.fas.org/man/dod-101/sys/land/row/at-7.htm>

9 <http://www.globalsecurity.org/military/systems/ground/m1-intro.htm>

10 Viktor Litovkin, “Is the RPG-29 to Blame for Israeli Failures in Lebanon?” RIA Novosti: Moscow, August 11, 2006. (<http://www.bintjbeil.com/articles/2006/en/rpg29.html>)

11 <http://www.csmonitor.com/2007/0119/p01s01-wosc.html> ; http://www.janes.com/security/international_security/news/misc/janes011001_1_n.shtml ; <http://www.india-defence.com/reports/2818>

12 The Canadian Leopard C2 is an upgraded version of the German Leopard 1A1. See WEG, pp. 4–8.1.

13 See the illustration in *Defense Update*: <http://www.defense-update.com/features/du-1-04/rpg-threat.htm>

14 Lester W. Grau, “The RPG-7 on the Battlefields of Today and Tomorrow,” *Infantry*, May–August 1998.

15 Bulletin 3^u, United States Army Training and Doctrine Command, U.S. Department of Defense, _

Washington: 1976 (Hereafter TRADOC-3u). The threat posed by RPGs to armoured vehicles is also discussed in the online magazine *Defense Update* at <http://www.defense-update.com/features/du-1-04/rpg-threat.htm>.

16 TRADOC-3u, p. 14

17 TRADOC-3u, p.7

18 TRADOC-3u, p.8

19 TRADOC-3u, p.14

20 TRADOC-3u, Ch. 2

21 TRADOC-3u, p. 16–17

22 TRADOC 3u, p.17

23 WEG, p. 4-8.1

24 Grau, *op. cit.*

25 Reuters, December 16, 2006.

26 Among numerous pessimistic analyses, see Jonathan Steele's literate and persuasive op-ed, "There Is Never Going to be a NATO Victory in Afghanistan," *The Guardian*, October 20, 2006.

27 Human Rights Watch Press Release, New York: October 30, 2006.

28 Aleksandr Sykholeskiy, "The guerrilla's artillery: The RPG in local armed conflicts," *Soldier of Fortune*, February 1996, p. 42.

29 I learned many of the details outlined below concerning the Afghan insurgents' use of IEDs and anti-tank mines in conversations with a retired general of the former Soviet Red Army Military Intelligence Directorate, who spoke with me on condition of anonymity.

30 <http://icasualties.org/oif/IED.aspx>

31 *ibid.*

32 <http://www.defense-update.com/features/du-3-04/IED.htm>

33 <http://www.afrlhorizons.com/Briefs/Dec04/MN0407.html>

34 <http://icasualties.org/oif/IED.aspx>

35 <http://www.globalsecurity.org/military/world/russia/t-72.htm> ; <http://www.globalsecurity.org/military/world/russia/t-80.htm>

36 An comprehensive but untitled U.S. army catalogue of landmines is cached at http://www.globalsecurity.org/military/library/report/2002/iraq-osgjs-eod_10-landmines.pdf

37 *loc. cit.*, p. H-20

38 <http://www.theglobalist.com/DBWeb/StoryId.aspx?StoryId=2720>

39 David Pugliese, *Ottawa Citizen*, February 11, 2007.

40 <http://www.army-technology.com/projects/leopard/index.html>

41 <http://www.globalsecurity.org/military/world/europe/leopard2-specs.htm>

42 http://en.wikipedia.org/wiki/Image:Leopard_2_A6M.JPG

43 <http://www.army-technology.com/projects/leopard/index.html>

44 <http://www.globalsecurity.org/military/world/israel/merkava.htm>

45 <http://www.defense-update.com/features/du-1-04/rpg-threat.htm>

46 <http://www.army-technology.com/projects/leopard/index.html>

47 *The New York Times*, February 10–12, various articles.

48 http://en.wikipedia.org/wiki/Image:EFP_IED.JPG

49 Here again I must refer to information provided by the ex-Soviet general cited above.

50 <http://www.afrlhorizons.com/Briefs/Dec04/MN0407.html>

51 <http://geo.international.gc.ca/cip-pic/afghanistan/menu-en.asp>