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ARMOUR BULLETIN

2011

LEOPARD 2A4M MAIN BATTLE TANK

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The *Armour Bulletin* welcomes articles and comments on topics relevant to the Armour Corps. The editors ask that the following guidelines be followed:

- Articles can be submitted in either official language;
- Only material of an unclassified nature should be submitted;
- Articles should be between 500-1500 words and submitted electronically to the editorial staff. Images and endnotes should not be embedded in the text;
- Photographs must be accompanied by the name of the photographer. Please note that you have unrestricted use of the *National Defence and Canadian Forces Image Gallery* (www.forces.gc.ca) so long as you cite the photographer;
- Comments may be submitted directly to the editorial staff, preferably via email;
- The editorial staff reserves the right to deny the publication of an article/comment or to edit articles/comments for content and/or length; and
- Each article must be accompanied by a brief biography and recent photograph of the author.

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About the Cover:

Leopard 2A4M Main Battle Tank at the roll-out ceremonies, Bergen-Hohne Range, Germany.

Cover design by ALSC.

Corps Leadership Forewords

Colonel Commandant
Major-General (Retd) C.J. Addy, OMM, OSTJ, CD

Let me first congratulate all involved in the quality and professionalism of this review. In the long tradition begun by our founder, Major General FF Worthington, it is important that the types of discussions that we see herein, among proven armoured warriors, continue to dominate our thoughts and consume our energy and interest. We do what we must to remain relevant and ready to serve our Army and Canada!

The profession of arms continues to evolve with such technologies as drones, cyber warfare, and the list goes on. However, in the end, in foreseeable major confrontations in which we might be involved, the essence of the combat team and its composition will remain and challenge us to adjust its equipment, size and command and control. Some almost forgot that, until we were quickly reminded of the costs of doing so in Afghanistan. Be careful not to throw away what works before you have a credible replacement IN HAND.

I have been impressed, as I know my predecessors would have, with the quality of leadership in our Corps, from MCpl to CDS. I have been served by three Directors of Armour, all outstanding warriors and leaders. Likewise the two Corps RSMs, three Commandants of the Armour School and their CWOs have done outstanding work building a great team. I recall the words of BGen Ned Amy, DSO, MC, OBE,CD who said, after a visit to the School in 2008 and listening to a simulation briefing given to us in a turret by a Cpl on attachment from 12eRBC: “Clive, I don’t think we are bright enough to join today’s Army.” There is a lot of truth there for many of the other older “know-it-alls.” We lost Ned this year along with many other remarkable armoured warriors, but their spirit remains VIBRANT at the School and a credit to what he and his peers built.

I witnessed the training of our armoured troops in Wainwright for the operations on the ground in Afghanistan. Likewise, I watched and took part as our Regiments said good-by to their fallen comrades and comforted and cared for their families with great class. I saw the absolute and exemplary blending of regular and reserve armoured warriors throughout the stabilization mission and the ready and professional capture of lessons learned as you see expressed in this bulletin. Yes we have a new tank, the best in the world, and will have a new reconnaissance vehicle or more. More importantly, we have the solid quality of leaders and soldiers who know and do well what is expected of them, put mission and subordinates ahead of themselves, and do this with pride and teamwork. Worthy would be proud!

Thanks for the privilege and honour of serving as your Colonel Commandant. I thank MGen (retd) Matt Macdonald and MGen Steve Bowes for their help and wise counsel as Senior Serving Armoured officers.

WORTHY!

Director Armour
Colonel M.A. Nixon, CD

I would like to begin by thanking the members of the Corps that have contributed to this fine publication; not only those that penned articles but also those from the Armour School that worked tirelessly to bring all the pieces together.

The Armour Corps is in great shape. With several years of successive operational deployments, we have honed our core competencies and are, without a doubt, the most capable Armour Corps in the modern world.

As the Army moves forward following the transition between missions in Afghanistan, we will see changes in the structure of the various elements that make up the Army. Enablers that were rapidly fielded to meet the operational necessities to be successful in the southern regions of Afghanistan will, for the most part, become institutionalized within the Army. This institutionalization will be achieved with no additional resources being added; so what? We will continue to see the Army structure change slightly. The current thinking sees a balanced Armour Corps with three regular force tank squadrons and seven reconnaissance squadrons available to meet expeditionary operational output expectations, and a Primary Reserve Armour Corps of 18 Regiments of various sizes to meet domestic operational output expectations and to reinforce the Regular component. However, as we all know, the one constant in the Army and the Canadian Forces is change.

The arrival of new equipment, such as the Family of Leopard 2, the upgraded LAV III Recce, the still to be determined Tactical Armour Patrol Vehicle and a replacement recce vehicle for domestic use by the Primary Reserve will present some significant individual training challenges, as well as some doctrinal adjustments. I have full confidence that the experience and professionalism of our NCOs and Officers will see us safely to the next bound; leading the Army into the future. We must continue to speak as one fully integrated Corps voice to meet future challenges head on.

It is indeed an honour and a privilege to be your Director, and I hope to see as many of you as I can over the coming months.

WORTHY!

Editor - in - Chief
Lieutenant Colonel J.J. Malejczuk, CD

The one constant that remains within any organization is change. As the Army 'reloads', meeting the requirements of transformation, regeneration, and reorientation will no doubt require flexibility and patience.

This edition of the Armour Bulletin will serve not only as the Line of Departure as the Armour Corps transitions to Force 2013, but more importantly stimulate dialogue on subjects such as the final fielding of Leopard 2 and the introduction of the Tactical Armoured Patrol Vehicle and LAV 3 Recce. In particular, the dynamics that 'mixed fleet' troops will have as we transition away from our primary reconnaissance workhorses will no doubt spark well-informed debate not only from a tactics, techniques, and procedures perspective, but also an individual training one when considering both officer and non-commissioned officer career development and progression, both Regular and Primary Reserve.

The Armour Bulletin serves as our professional forum where we not only draw analysis and insight from those things that we have done, but to also stimulate discussion and debate on all those issues – current and future - that will continue to feed change as we move forward. With that said, I encourage all of you to continue to share your observations and experiences by contributing future articles for publication.

In closing, I would like to thank to all those that have contributed articles contained herein in what can be considered another year of unprecedented *tempo.*

WORTHY!

Corps Sergeant Major's Corner
Chief Warrant Officer J.M.C. Belcourt, MMM, CD

I would like to thank the all those who worked hard to make this publication a success as well as to give me the opportunity to write you a few lines.

I agree with the Colonel Commandant about the outstanding quality of leadership in the Corps from MCpl to CDS. The strength of our Corps is our people and the values that have been passed down since the beginning. We must carry on with what we are doing. For example: currently on the Regular Force side we have five CWOs in senior appointments. This is testament to the quality of soldiers the Corps, producing almost ten percent of the CF senior appointments; and we have very good candidates following behind ready to compete.

There will be changes with the acquisition of new platforms but the Corps has proved to be absolutely capable before and the Corps will be up to the challenge, ready for the next mission. We, the Regular and Reserve regiments, have to work together as we did in the past. This collaboration has made us stronger and I know it will continue to do so. It is in our blood; it is our way of doing business.

Before I sum up, I would like to say thank you on behalf of all the men and women of our beloved Corps to our Col Cmdt MGen (retd) Clive Addy. He was my CO when I was a young trooper in Germany and I'm fortunate to have had the chance to work with him again. He has served the Corps for many years with immeasurable dedication. He has been a pillar for our Corps; again, thank you. I know he'll stay close to the Corps and we wish all the best to him and Marlene.

I will be retiring as well. I would like to thank the two Directors I worked with, Col Cade and Col Nixon, for their support. I would also like to thank all the COs and RSMs for your outstanding work. Finally, I would like to thank all armoured soldiers and officers for their great work and dedication. It has been an honour and a privilege to be your Corps RSM.

WORTHY!

Project Management in a Combat Zone
By Maj E. Landry

Major Eric Landry was a combat team commander from Nov 10 to June 11 in PANJWAYI. He is currently a student at the Canadian Forces College in Toronto.

When I took the project-management course at HEC Montréal in 2002, I never thought that I would be applying what I had learned in one of the tensest areas of Afghanistan. After spending only two weeks here, the commander gave me an informal warning order to explain the scope of the mission that would become my focus in the coming months.

The Challenge

The Horn of Panjwa'i (Western point) has been occupied by insurgents since the start of the conflict. They have great freedom of movement here and definitely have an influence on the local population. I was the Chief Plans for Task Force Kandahar (TFK) in 2007–2008. I made plans during our push westward three years ago. During the operations that we conducted, the problem was always that we lacked a truly good ground line of communication between the areas that were controlled by the Afghan National Security Forces (ANSF). The stars therefore aligned for my team to remedy that situation once and for all. We need to build a road that is wide, solid and safe for the local people as well as the ANSF and the coalition forces. The road will enable us to travel from east to west quickly, and thus curb the freedom of movement that the insurgents still enjoy.

Building a new road is always a complicated process. Building a road on one week's notice, with a team made up of members from three different countries, in an area that has been controlled by the Taliban for two years and where the local people have not yet been informed of the plan, is the most complicated mission that I have ever been give. Our American and Canadian colleagues who are working in partnership with the Afghan Army in villages to the west are impatiently awaiting the road, as they have only been able to receive supplies by air since they began operating there. The speed at which the road is built towards the west is therefore a very important factor. In addition, the weather is not in our favour, as the rainy season is approaching, the cold nights are affecting everyone's morale and the days are getting shorter.

The Opinion of the Locals

Compared to how long it took to finally decide what course Autoroute 30 would take, the decisions here are made at lightning speed. In just several days, I met with a number of people who would be affected by the project. Haji Baran, the governor of the district, is very much in favour of the project. The new road will benefit locals, as they will be able to travel safely. The road will also spur on the economy, since it will better connect the various bazaars and fields in the Horn of Panjwa'i.

For most people, the road is nothing but positive. However, for the farmers who are losing a portion of their fields or the landowners who must leave their houses, things are different. Although we have the local government's support, most people we meet have not been informed of the project. We must therefore take the time to fully explain the impact to locals and consult with local leaders to obtain their approval and suggestions. In addition to taking part in the official shuras, we must hold a number of impromptu gatherings on the ground. We must explain the claims process, the proposed course of the road, the damages that we are going to cause and, most of all, the security aspects.

Security

The construction of this road, which is 20 km long and 8 m wide with a security zone on each side, seems to strike locals as a big price to pay, as the people are currently content to use the existing road, which is 3 m wide. Nevertheless, we are advancing in an area that has been under the influence of the insurgents for a number of months. The IEDs that we have found since starting the project are proof of that. The construction of this new road will have a major impact on the insurgents' mobility in the future. It is therefore clear that their agenda runs counter to ours. The danger associated with the Taliban's ambushes, homemade bombs and other activities is very real.

The coalition forces work in partnership with the ANSF to protect the local people as well as the American engineers who are working on creating this new line of communication.

The Team

The Afghan National Army is leading this team. The Afghan soldiers meet with locals and direct them to bypass roads so that their lives are disrupted as little as possible. In addition to the members of the tank squadron, there are also infantry soldiers, sappers, and operators working in civil–military collaboration contributing to the Canadian Forces' effort. An American regiment that specializes in the construction of infrastructure is using a large number of its troops to build the road itself. Bulldozers, rollers, graders, and excavators work from sunup to sundown to extend the road to the western boundary of our area of operations.

Maj Eric Landry, OC C Sqn, and MWO Alain Champagne, SSM, discuss with local workers and the CIMIC Team.
(Photo by Capt P. Croteau)

Technical Challenges

Afghan fields are irrigated via a complex underground system that has been in use for several hundred years. Building the road on that spongy ground poses major technical challenges that engineers at all levels of the chain of command are trying to solve. The provision of materials and various types of soil are therefore important factors to take into account—factors that I am unable to evaluate, given my background in marketing. My team therefore receives a great deal of help from experts, who are working on the technical problems associated with the road while I evaluate the security needs. Synchronizing everyone's efforts is therefore the combat-team command post's priority.

My Vision

The complexity of this project is motivating all members of the team. In a counter-insurgency context, the most challenging thing to do is find a balance between promoting local governance, sustainable development and reconstruction and providing a safe environment. The project that I am commanding perfectly embodies those three aspects. After a week of work, we have dealt with our fair share of obstacles, but I am convinced that we will be able to look east, from Do Ab, in a few months with an overwhelming feeling of pride. This road will be the backbone of the Horn of Panjwa'i for years to come. It will contribute to economic development and the safety of local inhabitants—concrete proof of the permanent mark that our troops will have left on Afghanistan.

Work on the Road to Mushan Continues
By Maj E. Landry

A tank from C Sqn, TF 3-10 patrols along a stretch of the unfinished road.
(Photo by Maj E. Landry)

C Squadron has been working on the new road to Mushan for more than 80 days now. The challenges are ongoing and increasingly complex. We knew that building the road would be arduous and challenging, but we did not realize to what an extent. The workers at the site are therefore tired but very proud of what they have accomplished up to now. Over the past few months, the newly constructed Route HYENA has become the C Squadron combat team's trademark. When I call home to catch up with my family, my son Vincent, who will be seven next month, asks me excitedly, "So, how many kilometres of your road have you built?"

Changeover

A number of significant changes have occurred. Firstly, the members of the combat team have stayed more or less the same; however, the Afghan Army platoon that was working in partnership with us has been replaced by a full company. That has had a major impact on the "convince" aspect of our mission, as now Afghan Army officers are the ones who are explaining the benefits that the road will bring and, more importantly, the sacrifices that the locals must make to facilitate the construction of the road. Secondly, we have lost the services of the Seabees. That bulldozer team from the United States Navy was known as the best in Kandahar. Since its departure, the team's engineers have made even fiercer efforts to make up for that loss. And, thirdly, the U.S. Army platoon that has been at our side since the beginning and that is working on building the road itself will be leaving the country after spending 12 months in Afghanistan. They will be replaced by another group of Americans—their identity has yet to be revealed to us.

The biggest change that has occurred has not been within the combat team; rather, it has been within the local government. Panjwa'i District has a new governor: Haji Fazluddin Agha. He appears to be a competent leader who is attuned to his fellow citizens. He wants to listen closely to what they have to say and take concrete action with respect to development in the district. That has had a direct impact on the road's construction.

The CIMIC team and ANA distributing winter clothing. (Photo by Maj E. Landry)

The Local Mindset

Since the beginning of the project, one of my main tasks has been to communicate the challenges associated with building the road to the local population and get their input on where it should be built. The new road diverges from the old path in a number of places for reasons of security and efficiency. In the villages of Sperwan, Zangabad and Mushan, the local elders arrived at a consensus and acted as spokespersons on behalf of the communities. For various reasons, the inhabitants of Talukan were never able to arrive at such a consensus. Threats from insurgents and the political weight of some landowners were a major source of the problem. The new governor decided to get involved in the matter personally.

The district governor therefore attended a number of shuras to hear the grievances of his fellow citizens. The atmosphere at the meetings was very tense, and we knew that some people did not dare voice their views. After consulting with the coalition forces and the Afghan national forces, Haji Fazluddin Agha finally found a compromise that satisfied the inhabitants of the bazaar and townships of Talukan. He thereby proved that he is a leader who can rally people together, just as he promised he would be.

A *shura* in Mushan. (Photo by Maj E. Landry)

By consulting with the local people, we strengthened their feeling of involvement in the road-building process, and we had to force ourselves to interact with them in a positive way. We employed several hundred people in building the road. From having locals repair irrigation systems to getting them to improve the condition of buildings along the road, our civil–military cooperation team has done an excellent job of providing people with work during a period in which employment opportunities are few and far between. We also helped the Afghan Army distribute winter clothing to children, which was a very successful initiative.

Security Challenges

In order to build the new road, gravel must be delivered to the worksite on a daily basis. Hundreds of trucks driven by honest Afghan workers must therefore be managed on site. Insurgents, in their aim to slow down construction of the road, have begun targeting gravel trucks to the point where I must now escort them with tanks. Escorting the trucks has had a very positive effect, which has helped to allay my fear that we will run out of gravel.

The improvised-explosive-device (IED) threat is still very real. We have had to slow down our progress and adapt our patrols along the road to stop these deadly devices from being planted. Luckily, no locals or soldiers have been injured yet, but we must remain vigilant. The Afghan soldiers are solid allies in our fight against IEDs; some of those soldiers have located such bombs and we have been able to remove them from the road.

A tank patrols the road. (Photo by Maj E Landry)

A parade that was held to present the C Sqn coin to a member of the ANA who found an IED. (Photos by Maj E. Landry)

Rain

When this project began in November, the engineers all insisted that the road would have to be built before the beginning of the rainy season, which usually starts in March. Mother Nature was not kind to us this year. Torrential rains began a month earlier than usual. The members of the squadron had to work in over 50 cm of mud. All of the civilian vehicles got stuck. The combat-team soldiers therefore transformed themselves into CAA tow-truck drivers. The tanks towed not only the locals' automobiles; they also towed Afghan National Army vehicles and American bulldozers.

So much water accumulated that we had to stop construction on the road. Moving the wheeled vehicles had become completely chaotic. Irrigation ditches had to be dug all over the place in order to direct the water away from the road and our camps. The good news is that, once dry, the road was very solid, as it had been well compacted. It was the first time that the completed portion of the road had been put to the test, and it passed with flying colours, as it held up everywhere. Even civilian vehicles were able to use it, in spite of the large quantity of water that fell.

Road Completion

I am really looking forward to calling my son to tell him that the road is finished. We are about two-thirds done. The fact that the road can withstand torrential rainfalls is a very positive sign. In spite of all the setbacks that we have encountered up to now, the morale of my troops remains high. We will soon complete the last stretch of the road, which ends just a few kilometres to the west of Mushan. The locals use the road daily, and the smiles that we see on the travellers' faces is a clear sign of our success.

The Triumphant Return of the Armoured Echelon
By MWO A. Champagne

Captain Pascal Croteau (top) and SSM Alain Champagne (bottom) distribute warm clothing and shoes to an orphaned girl near a village during TF3-10.

A number of years ago, the sergeants-major of armour squadrons had their echelons removed and transferred to a centralized element. B vehicles and their drivers were centralized within the regimental transport troops. The vehicle, weapons and electronic/optic technicians, for their part, were grouped together within a huge regimental maintenance troop. The era in which technicians were assigned to each troop came to an end, as did the era in which technicians knew all the little ins and outs of the squadron vehicles and each soldier knew his or her technician. The dismantling of the echelon created technicians on-demand, which in my opinion, went against the old Canadian war principles of maintenance of morale, economy of effort, flexibility and cooperation. From that point forward, it was difficult for an OC and SSM to plan a training exercise on short notice because it required so much administrative paperwork. We had to request our B vehicles, submit a precise schedule and specify whether we wanted a driver, all without knowing whether or not we could keep the same trucks and drivers for the entire exercise.

Luckily for our squadron, the good will of the 1 R22eR BG Svc Coy allowed us to travel back in time; it seconded us our maintenance section and the AHSVS 16 T driver team. In addition, the medical team did pretty much the same thing by seconding us our ambulance team starting in April 2010. The tank squadron then finally had a real armoured echelon.

There were no pitfalls, and only a few minor adjustments had to be made with respect to cohesion. The squadron is no doubt the most flexible sub-unit in the BG. In just a few hours, the squadron commander can deploy his or her tanks where he or she sees fit without requiring any external support. The training was beneficial for everyone. When the squadron needs to resupply a sub-unit or participate in an operation, everyone pitches in. In the blink of an eye, our ambulance driver, Pte Bouchard-Trudel, can become a POL guy, and our medical technicians, MCpl Rioux and Cpl Horvath, can serve as shura hosts. Our weapons and electronic/optic technicians can become an improvised blocking force with their TLAV MRT. Our ARV operators, for their part, can turn into culvert installers or Armand Guay crane operators.

Leopard 2 ARV working on a crashed CH147 Chinook Helicopter (Photo by MWO A. Champagne)

TF 3-10 C Sqn Maintenance Troop. (Photo by MWO A. Champagne)

Let's not forget the heart of the echelon—Sgt Laberge's gang—our AHSVS 16 T drivers, whose role it is to support the squadron. Their uniforms are perpetually soiled with diesel, oil and dust. As soon as we arrived, the squadron's administration troop repaired the showers and started a number of projects to improve the squadron's sectors at FOB Mas'um Ghar. When not employed as truck drivers, most of the soldiers are employed as drivers and gunners in assault tanks. Each cargo truck has been meticulously loaded so that we can meet class I, III and V requirements for 96 hours for each truck at all times.

Since we arrived in theatre, the echelon has been deployed every day to support Op PASS RAFTAN. It is composed of a variety of support vehicles every day, depending on what is needed. One new arrival is a TLAV for transporting detainees; it is commanded by MCpl Latour. The echelon must support a combat team composed of an Afghan National Army (ANA) company, sappers from 52 Sqn, infantry soldiers from PARA Coy, US Army engineering elements, a US Navy engineering team, a CIMIC detachment, a psychological operations team and an IED team—a lot of personnel and vehicles we have never trained with before.

SSM Champagne's TLAV on the road, which has become a field of mud.
(Photo by Maj E. Landry)

I feel incredibly blessed to command a full echelon. I sincerely hope that armour squadrons can, in the near future, regain the flexibility that they had in the past. Centralizing armoured echelons within the regiments was no doubt aimed at cutting costs; however, the bigger the machine, the longer it takes to get anything done and the less services there are, in spite of all the effort invested. Thank you to the BG Svc Coy, the NSE medical detachment and TFK for all of the men and women who were seconded to us in order to carry out our task and help us realize a dream.

Editor's note: Lessons learned from Afghanistan were obvious to the Armour Corps; we require an echelon. Echelons greatly enable the flexibility of combat operations and are essential for dispersed operations. Based on this lesson, the Army has re-incorporated echelons into the future expeditionary force structures.

C Sqn, 1 R22eR BG Marks 100th Day on the Road
By Capt P. Croteau

Capt Pascal Croteau deployed on TF 3-10 as BC C Sqn, 1 R22eR BG and is currently employed as 12e RBC Regimental LO.

March 7, 2011, was the 100th day of construction on the road linking the Horn of Panjwa'i with the city of Bazaar-e-Panjwayi in Panjwa'i District, Kandahar Province, Afghanistan. Bazaar-e-Panjwayi is the economic centre of the region and is one of the biggest metropolises in the province.

The tank squadron oversees progress on the road day after day by coordinating the technical expertise for the project provided by 52 Combat Engineer Squadron and an American construction-engineering platoon. A lot of things have happened since the initial ground breaking took place over four months ago, 12 kilometres to the east. The members of the combat team, made up of the tank squadron, the reconnaissance squadron, the para coy (infantry) and de-mining staff, as well as elements from psychological operations (PSYOPS), civil–military cooperation (CIMIC), the Afghan National Army (ANA) and the Afghan National Police (ANP), have put a great deal of effort into carrying out this very complex mission.

The tank squadron and infantry (both Canadian and Afghan) have found a number of improvised explosive devices (IEDs); they have protected construction engineers and civilian contractors, pursued insurgents, and tirelessly patrolled the route to prevent insurgents from planting IEDs and to thwart ambushes.

The combat engineers, in partnership with the Afghan National Security Forces, cleared a record number of roads, fields, buildings and grape huts. They have done a remarkable job managing, searching and escorting gravel trucks on the worksite. The combat engineers have also built access-control infrastructure, commonly known as access check points (ACPs), on the road, and are preparing to build a number of other ACPs to improve security for everyone in the region. Once completed, those ACPs will be used by the Afghan National Police, the Afghan National Army, and the Canadian mentors. The ACPs are used to control movements on the road and prevent the transportation of weapons and IEDs and the arrival of combatants from outside the region. The members of each ACP are also responsible for clearing a portion of the road on a daily basis to ensure that the insurgents have not planted any IEDs at night. The insurgents do not have the same fire power as the coalition and have taken to attacking civilian gravel trucks with small arms. They hope to intimidate the truck drivers so that they will not show up to deliver the gravel, which would halt construction on the road.

In addition to helping build the road, our CIMIC team has also done a wonderful job managing hundreds of claims and generating development projects. Providing people with work and a means of making money is a weapon in and of itself, and it serves as a very effective development tool in the Horn of Panjwa'i. It pulls the rug out from under the insurgents' and drug-producers' feet by providing an alternative source of income that is more dependable and beneficial for the communities. The people who are working for the coalition are taking huge risks and frequently receive threats from the insurgents, and that is why we are going to such effort to protect them.

Lt Cossette of 52 Fd Sqn explains to local leaders the future layout of the road. (Photo by Capt P. Croteau)

A Leopard 2 Tank with mine rollers supports American engineers conducting road work. (Photo by Capt P. Croteau)

The Regiment's reconnaissance squadron also plays a very important role in the operation by patrolling and establishing observation posts on the portion of the road that is already built. To do that, the dismounted infantry reconnaissance platoon and sniper detachments have been attached to the squadron. Their presence, in combination with that of the Afghan National Army and the airborne surveillance resources, has considerably reduced small-arms attacks and the planting of IEDs. We must adapt our methods every day and remain unpredictable, as the Taliban are always watching us and trying to figure out our weaknesses.

They sometimes manage to slip through our defences and plant IEDs or fire a few bursts to harass us, but their effectiveness at present is very limited. That is the result of everyone's hard work and the painstaking progress we have made. Nothing is left to chance, and the sub-units all work together. More and more farmers and villagers are showing us where weapons caches and bombs are hidden or are tipping us off to the presence of insurgents in their village. That phenomenon, which was extremely rare during my first stay here in 2007, is a very encouraging sign. I must nevertheless admit that the speed at which progress is made in the Horn of Panjwa'i is never fast enough for our tastes. The "Afghan problem, Afghan solution" approach is sometimes very difficult to apply, and our North American mindset is regularly challenged.

In January and February, the weather was terrible and slowed down progress on the road leading west. Non-stop torrential rain turned the road and neighbouring fields into a sea of mud. Only the tanks were able to patrol the stretch of road under construction, but doing so caused the tanks' parts to suffer premature wear and tear. As a result of the bad weather, the squadron's tankers had to devote much more time than usual to maintaining our vehicles. At the end of a typical day during that period, it was not uncommon for crews to have to change up to 18 road wheels upon returning to the forward base or to the temporary combat-team camps at night. The tanks nevertheless continue to perform very well and are the best all-terrain combat vehicles currently in Afghanistan. As they are the only tanks in the region, we were called upon to conduct a number of recovery operations, both of coalition military vehicles and gravel trucks. Our maintenance and recovery teams have developed unusual ways to extract Afghan vehicles from the mud without damaging them—picture a 50-ton armoured recovery vehicle (ARV) with an 1,800 HP motor pulling a tiny Toyota Corolla or gravel truck whose cab is held together with nothing but rope and duct tape!

Left: ARV BRUTUS in action under the supervision of the tank-squadron maintenance sergeant. Right: ARV CALGARY recovers T33 mine rollers that had been completely submerged in mud near Sperwan Ghar. (Photos by Capt P. Croteau)

The squadron echelon, for its part, under the command of Squadron Sergeant-Major (SSM) Champagne, did not stand idle. On a daily basis, it supported over 60 vehicles and 300 people from three different countries. Every week, the SSM and his team had to relocate our temporary camp along the road in order to follow the progress of the work. The camps were the bases for all of the supplies, repairs and meals; they also housed personnel and served as a warehouse for the vehicles of the two American platoons working for us. The camps were also the departure point for all of our night operations and road patrols. There were always Canadians present, including at least one tank, infantry and sapper (engineer) troop, to defend the camp, as the Americans were mainly devoting their efforts to constructing the road, and Commander Task Force Kandahar, Brigadier-General Milner, had placed them under our responsibility. After spending long hours ensuring that the road was safe so that they could work, we also had to protect them at night in temporary camps. When the time would come to relocate the camp, the SSM, the squadron commander and the CIMIC teams would go out and conduct reconnaissance with the infantry in order to find an area that could accommodate everyone. The site had to be big enough to set up the entire combat team, and they had to negotiate an agreement with the local farmers to rent the space. Once it was set up, the camp would inevitably become a source of great interest to members of the local community, including many children. After the location had been found and the agreements had been signed with the owner of the site, a mine-clearance operation would be performed. The bulldozers of the Seabees, the famous United States Navy unit that was created during World War II during the Battle of the Pacific, would prepare the grounds by erecting mud walls around the perimeter to reduce the risks in the event of an attack. Once the mud walls were in place and the barbed wire had been installed, the combat team would move to its new camp. Once they were set up there, the Seabees or the Canadian engineers would repair the former site in accordance with the agreements made with the site's owner so that the farmer could once again use the field. The combat team has moved six times, and may have to do so again in the coming weeks in order to finish the final few kilometres of road that remain to be completed.

We set up medical clinics in the temporary camps in addition to distributing warm clothing and holding a record number of shuras (official meetings with local leaders) to discuss the impact of the road and any changes that needed to be made to it so that the local people's wishes could be taken into account as much as possible. The squadron commander, Major Landry, and SSM Alain Champagne quickly mastered the art of selling the project and allaying the fears that local people had that the road would destroy a part of their fields.

The SSM is over six feet tall and weighs more than 250 pounds, and he deeply impressed the Afghans. He quickly became the elder of our "tribe." Discussions during shuras typically last many hours. Initial introductions and courtesies can last over an hour. Once again, our echelon soldiers performed admirably, serving oranges or tea to the guests while the Afghan Army and Canadian infantry oversaw security and searched participants. By adopting a solid posture and searching people, we sent a message to the insurgents who sometimes attended the shuras that the maximum security measures were being taken. In this tribal and extremely traditional society, people respect warriors and scorn any sign of weakness.

Sergeant Ouellet of the psychological operations (PSYOPS) detachment greets local leaders after they have been searched by an Afghan soldier during one of the many shuras that the combat team conducted. (Photo by Capt P. Croteau)

As the road was being constructed, the squadron led around ten other operations, which involved, among other things, serving as supply-convoy escorts for American troops and clearing villages of weapons caches in the vicinity of the road. Like all of the other 1 R22eR BG sub-units, we were very effective at finding weapons caches and IED components, and we were able to disrupt insurgent operations thanks to the remarkable work of Para coy, which supported the squadron.

The members of the combat team decided to name the road the Route des Braves (Road of the Brave) in honour of all the soldiers who were injured and the one soldier, Corporal Steve Martin, who lost his life during our operation. They joked that if we could not rename Autoroute Henri IV the "Autoroute des Braves," at least in Afghanistan we had the ability to name the road what we wanted. The road is not yet finished, as we still have a few kilometres of it to complete. The challenges to come are just as great as the ones we have already encountered: with the return of the warm weather, the insurgents will become more active and will desperately attempt to impede the road's progress. When they do, they will face a team of seasoned, inventive veterans who are ready to give them a run for their money.

QUEL QUE SOIT L'OBSTACLE – ADSUM

A Leopard 2 A6M tank in action during OP PASS RAFTAN – road construction. (Photo by Capt P. Croteau)

The Importance of Developing and Maintaining the Leopard 2 Team
By WO C. Moreau

WO Chuck Moreau is the Leopard 2 Team Leader at the Armour School.

As of August 2011, the Armour School formed the "Leopard 2 Team". This team was dedicated solely to the development of the Leopard 2 Center of Excellence and to advise the chain of command with regards to bringing all variants of the Leopard 2 main battle tank into active service.

The Armour Corps has introduced new vehicles before; what makes this different is 'how' it was introduced. It was procured out of the requirement to better protect our troops serving in Afghanistan. Knowing that the training has been tried and tested by Canadian troops deployed on operations makes the implementation training that much more challenging and rewarding. Simultaneously, the entire training system is going through a major overhaul. The conventional war-fighting method of training is now supplemented with Counter Insurgency Operation, making the development of training more interesting and challenging. We now have to look at rounding out our tank crews and not concentrating on strictly one way of doing business, but giving them more tools to conduct operations across the spectrum of conflict.

Along with our advisory capacity and courseware development, the Leopard 2 Team has another task that all team members enjoy: commissioning the tanks as they come off the assembly line. Of course we do not get to fire them all ourselves. The Team will be developing and implementing the commissioning plan, including training the already qualified Leopard 2A6 Crews on the Leopard 2A4M and the Leopard 2A4 Canadian variants.

The Team is currently at a minimum manning state but by March 2012 should see the Team at full strength with four members. That will be just in time to set up the commissioning plan for the Leopard 2A4 coming out of refit from Rheinmetall Canada. June 2012 will see Gagetown welcome the first six Leopard 2A4s for commissioning followed by six more in July and then in groups of six until all 42 tanks are completed. In the mean time, the Team is concentrating on developing courseware for basic gunnery courses, basic driver and maintenace training (D&M) and the plethora of conversion courses across all variants of the Leopard 2 turret.

After careful consideration of the conversion and training requirements, the Leopard 2 Team has recommended that all three variants be taught as part of baseline individual training. Therefore, a driver will learn how to drive all three Leopard 2 variants and likewise for the gunner and crew commander. The additional training is negligible and will prevent issues at the Units later – personnel will qualifiy on all variants.

Overall, the Leopard 2 Team has accomplished a great deal of work as a focal point of contact between the Corps and DLR project staff. Establishing a team of qualified individuals with knowledge and experience on the platform has proven to be effective as it streamlines communications and keeps the Corps up-to-date on any changes within the project. Early planning and investment into the Leopard 2 Team now will ensure a smoother transition Corps wide.

Editor's note. The Armour School's Leopard 2 Team will provide the template for our approach to other incoming projects like LAV UP, LAV Recce and TAPV. The Leopard 2 Team has already had great success and, with continued support from the Regiments, the Armour Corps will be well positioned for future challenges.

A Leopard 2 firing in Germany. (Photo by WO C. Moreau)

Leveraging the Advantages of Simulation
By MCpl R. Carson

MCpl Roger Carson is the Virtual Battle Simulation Lab 2IC at the Armour School.

On the morning of 3 October 2011 at 0800 hrs, the Armour Reconnaissance Troop Leader course started battle procedure. An hour and a half later they mounted up at Worthington Tank Park (WTP) in preparation for H-Hour. At exactly 0935 hrs, C/S 31 pulled out of the admin area and began clearing routes to the north. C/S 31A remained vigilant in an over watch position while 31B completed a bridge drill on Tok Chong Bridge. 15 minutes later, using indirect fire, C/S 31D destroyed two BMP's and a section of dismounts that had been securing the mouth of the McKinney defile. At 1145 hrs, C/S 31F called in a contact report on an enemy road block, located at the bend in the obvious orange route at grid 130 521.

At 1150 hrs, the course officer called "end EX" and the staff debriefed the students who were being evaluated that morning. The six car coyote troop travelled a total of 576 km that morning, using 500 rounds of 5.56mm, 60 rounds of 25mm Sabot, 16 rounds of MBGD smoke, and 24 rounds of 155mm HE artillery ammunition. And all this training was provided without a single vehicle rolling

Virtual Battle Simulator screen-shot. (Photo by MCpl R. Carson)

The Armour School's Virtual Battle Simulation Lab has been providing support to leadership courses for approximately five years. Using the VBS2 simulation platform created by Bohemia Interactive Inc., a 3D virtual battlefield is created based on a commercial first person shooter video game. The lab operators utilize an advanced mission editor which allows them to tailor the high fidelity virtual world for a vast array of training purposes. The settings for the artificial intelligence can be modified, allowing the enemy force to take both aggressive and passive responses, which makes it a flexible system capable of supporting both mounted and dismounted operations.

The Armour School has put approximately 450 students though simulated training in the past year, reducing the number of days required for field training. This allows both students and instructors to spend more evenings in their homes with there families improving their quality of life. It also reduces the amount of wear and tear on the training fleet, as well as saving millions of dollars in vehicle fuel, spare parts, ammunition, rations, consumable supplies and field pay for those involved in the field training, including all required support staff, all while maintaining the Armour School's high standard of training.

Virtual Battle Simulator screen-shot. (Photo by MCpl R. Carson)

Always looking towards the future, the Combat Training Center is planning to acquire the new Land Vehicle Crew Training System (LV CTS) by 2018, in order to assist with training crews on the new fleet of Army vehicles. The LV CTS will be an entire facility to allow for both individual and combined arms tactical training up to the combat team level. The facility will consist of high fidelity simulators (where full crews will be placed in functional vehicle mock ups) for the LAV UP, Leopard 2, and CCV and will also include a suite of medium and low fidelity simulators (VBS and JCAT type computer based simulators) for other vehicle platforms. While these simulation tools do not eliminate the need for field training, they allow standardized training to be conducted in an effective and efficient manner, and allows the Army to be fiscally responsible during a time when restraint is becoming more necessary.

Although LV CTS is not expected before 2018, much of the capability exists today in each Area Simulation Centre. Although low fidelity, it is possible to link VBS 2 and JCATs together in the same virtual environment. In the pasts, the uses of the two systems was separate and geared towards different levels of training: crew/patrol training versus command training. Now both can be linked such that Troops, patrols and crews are operating in VBS while Sqn HQ and above are working in JCATs. This set-up was used extensively during the Reserve DP 3 Armour Recce Squadron Commander's Course to compensate for the fact that traces were done in simulation as a result of resource limitations.

As you can see the Armour School is continuing to acquire the latest technologies available to be integrated into its training. The purpose is not to replace field training, but to allow for students to learn skills more quickly within a controlled environment, and to go to the field with a better mastery of certain skill sets so that soldiers are more successful faster once they commence field training. With the continued use of simulation, the Armour Corp will continue to field extremely successful crewmen for years to come.

Editor's Note: Work is going into expanding the Armour School's Battle Lab in order to optimize it for sub-unit and below training. While the needs of the Armour School in support of training are somewhat unique, these systems offer an inexpensive and effective means of honing combat skills when field deployments are not supportable.

NCM Career Progression – Whether Tank or Recce
By Maj J.R. Bosso

Maj John Bosso is DAT IT Armd at LFDTS HQ.

Background

The perennial question of Tank or Recce, in many disparate contexts, has often been the basis of a discussion, principally in jest as the source for healthy rivalry within the Corps. Most recently however, it has been a discussion in earnest, regarding where our individual training (IT) focus should lie. In fact, we are both tank and recce, and our formal structured training should reflect this.

In the relatively recent past, the Corps shifted focus from tank to recce within our career progression courses. Prior to this shift, structures of the past saw the tank squadron as the dominant organization within the Regiments; three tanks squadrons to one recce squadron. The reliance on "on the job training" (OJT) for those employed within recce, was a manageable risk as, prior to the introduction of the Coyote, the equipment was less technical, and appointment to a recce squadron was based on selection or on volunteers.

The introduction of the technically complex and turreted Coyote in 1996, followed several years later by the announced "death of the tank" and planned consolidation of the Army's Anti-Armour assets into Direct Fire Regiments, led to the logical construct whereby recce focused training supplanted tank training as the focus of IT. With the reinvigoration of the tank, from deployment of Leopard 1C2 in October 2006 to the present institutionalization of Leopard 2, the Corps is in the tank business but we do not have an efficient supporting IT framework.

The present recce focused IT system places additional training time burdens on the generation of tank crews above that required of recce. Further, current training is highly prescriptive within DP1 and very lengthy within DP3 including significant additional training for those destined for service on tank. It has also resulted in some over-training for recce, as all MCpls need the Patrol Commander course for promotion to Sgt, though not all Sgt's will necessarily be immediately employed as Patrol Commanders. Additionally, a recent change was established with respect to promotion to Sgt. Promotion to Sgt required Patrol Commander if employed within recce but not for tank; tank commander was the requirement. For those employed within recce, this produced dissatisfaction as career development fell two years behind their tank peers for promotion to that rank level.

Factors

There are many pressures that weigh on training design decisions including, in very broad terms, the availability of capital, human, and financial resources, as well as time. The following specific factors will directly affect any training design solution:

> **Training Time**. The current training climate within the Army demands that at a minimum, we keep our training "no growth" and reduce wherever possible. Train to need and just in time training are fundamental guiding principles within all Army training design.

Force 2013 Structures. The reduced number of sabre squadrons, seven recce and three tank, necessitates a flexible training system that enables a quick path to cross-train in order to ensure sufficient provision and sustainment of both tank and recce squadrons on LoO3 and recce squadrons on LoO4. Further, as the distribution of tank and recce squadrons is asymmetric among the Regiments, a training emphasis on either tank or recce will potentially disadvantage one or more of the Regiments.

Family of Land Combat Veh (FLCV). The entire vehicle fleet will be replaced in the following relative ratios. These ratios highlight that most crew command positions will be in a non turreted TAPV. Further, MSVS within the echelons of all squadrons will represent a large percentage of all available driver positions.

TAPV 47%
LRSS UP 18%
LAV UP 13%
Leopard 2 22%

Vital ground. Our core skill set is our ability to move, shoot, and communicate on a turreted and stabilized gun platform. This skill set will be central to any future training system.

Primary Reserve (PRes) Integration. The PRes will remain recce on LUVW(Mil) and TAPV, however, inclusion and integration of the PRes into IT courses is essential.

Proposal

A redesign of the developmental period training, from DP1 to DP3, could see an equivalent emphasis on both recce and tank. Where appropriate, delivery of training courses should be based on employment and delinked from promotion.

The current DP1 prescribes two specific primary combat functions (PCFs), Coyote driver and surveillance operator. This places a large burden on the School and results in soldiers trained in skills for which they will not be immediately employed. Further, soldiers destined for tank squadrons or echelon appointments will need further training immediately upon arrival at their Regiment. A flexible DP1 that provides one of several PCFs, selected by the Regiments based on need, will reduce resource burdens, and ensure that all soldiers are immediately employable upon arrival at their Regiment. A second PCF, delivered within the DP2 cycle of a soldier's career and based on need, can be conducted at the Regiments without urgent time pressures.

The current DP3A encompasses both recce crew commander and patrol commander. The establishment of DP3A as strictly crew commander would align tank and recce career progression while the establishment of patrol commander as an employment based specialty specification would ensure that needs-based and resource efficient training principles are respected. A modularized DP3A crew commander could contain a common first module, and either a recce or tank field module. Such a modular approach would leverage common skills, provide baseline knowledge of both recce and tank tactics to all crew commanders, and provide a clear and efficient cross-training path when required. The platform for the field portion must always be on a turreted platform (LAV or Leopard; PRes on TAPV) to ensure that our IT vital ground is protected. DP3B, should utilize the same modular approach to the same effect.

Conclusion

A flexible approach, which trains our soldiers in skills that they need at the time that they need them will provide the corps with the highly skilled professional NCOs on which we have always relied while husbanding the Army resources used to support that training.

FIND 2011 Conference, Bisley, UK
By Capt S. Curley and Capt P.L. Nicolas

Capt Sean Curley (left) is currently 2IC B Sqn, RCD and Capt Pierre Luc Nicolas (right) is currently the Tactics Tp Ldr at the Armour School.

At the beginning of the month of November, the Armour Corps sent Capt Nicolas and Capt Curley with a few members of the Infantry School and some personnel from Ottawa to the Modern Infantry and FIND 2011 conferences at the National Shooting Center (NSC) in Bisley, UK. The conferences were very interesting and created good relations with our neighbours from the Infantry School. As you might be aware, the UK Army is going through the same hard time we had about twenty years ago and working hard to ensure that their way of operating will survive with major budget cuts. Many recurrent themes were taking place during the two day of conference, but all of them were centered on the soldier himself, how to empower them, reduce their burden but still increase their ability to conduct their tasks.

The opening remarks by Major-General Bill Moore, the UK's Force Protection Modernization lead, included some interesting thoughts on the approach taken to identifying and weighing the decisive factors in vehicle design. The classic vehicle design model compares firepower, protection and mobility with each factor weighted in accordance with the specific purpose that the vehicle in question. For instance reconnaissance vehicles may sacrifice firepower and protection to increase mobility and so forth. MGen Moore proposed that a new design model that provides greater clarity when conceptualizing new vehicles and greatly emphasises the importance of enabling the crew of that vehicle:

The Factors of Vehicle Design. MGen Moore argues that ideally there are four corners to factor into vehicle design (vice three). The four corners are firepower, mobility, protection and information. The first three do not change from current approach to design and function but the Information corner does encompass C4ISR with emphasis on surveillance and reconnaissance enablers and the ability to process and understand information as it is received.

Survivability. The four factors outlined above comprise vehicle survivability. The vehicles ability to move, shoot, communicate, shield its crew and process information are all part if its ability to survive in battle.

Freedom of Manoeuvre. Increased survivability improves a commander's ability to freely move and manoeuvre throughout the battle space. It can further be increased by augmenting kit and/or training across the five functions (Command, Act, Sense, Shield, Sustain). For instance, adding C-IED training and equipment (LCMD) improves the crew's ability to shield itself (added protection) and improves mobility and freedom of manoeuvre. Applying the correct vehicle configuration to a given theatre problem set (MBTs vs TAPV - for instance) facilitates a commander's freedom of manoeuvre. Taken together, factors that enable a given organization's freedom of manoeuvre facilitate a commander's understanding of the battle space and facilitate his decision cycle.

Empowered Soldiers. The final factor when designing vehicles and customizing them to a given theatre problem set is empowering the crews themselves. This is done through accurate and effective Theatre Mission Specific Training, cultural and language training and the provision of personal weapons customized for use in the given environment. Soldiers are also empowered two other ways:

Reduction of Dismounts' Weight Load. When crews dismount they do so with a very large load that can often add up to weights in excess of 60 kgs. Decreases in personal kit weight load equal increases in freedom of manoeuvre, which sees increases in survivability. This, in turn, can increase mobility and information gathering capability and lead to greater successes in the battle space.

Facilitation of Command Decision Regarding Personal Protection. One way of seeing immediate results in reducing weight loads is empowering local commanders to decide (based on the tactical situation) what PPE their soldiers will wear and which items can be left in the vehicle. Currently, many nations serving on operations abroad require that the maximum possible PPE be worn. They have removed the commander's prerogative to tailor the force to a given task. This requirement is a direct result of risk aversion and arguably results in an ironic increase in risk through a decrease in manoeuvrability and a related decrease in survivability. At the core of this issue is an inherent lack of understanding regarding the risks that must be factored into a given estimate.

The UK army also intends to change the vast majority of their Armoured Fighting Vehicle (AFV) with their 2020 plan. Even though all their projects are still at a conceptual base at this time, they are working with General Dynamics in UK for their new fleet of vehicle including the Specialist Vehicle (SV): a tracked vehicle that will provide them with a scout capability. Given that it is a common base platform, it can also be configured as recovery, repair, and troop carrying variant. Did we mention that it was a tracked vehicle? This vehicle will be able to be shipped in large air craft and will possess the mobility to follow any other vehicle in their fleet, similar to the Bradley assault vehicle for the US Forces.

The second very interesting speaker was Colonel Ian Bell, the CO for Air Defence and ISTAR in Army HQ. His very compelling view was that most units' roles, as his was, was surveillance rather than true reconnaissance. This was an absolutely excellent discussion on the current state of ISTAR operations in any given theatre and what needs to be done to get these operations back on line. In essence, Col Bell argued that missions ostensibly conducted in the name of ISTAR are largely conducted improperly. This is because commanders and staff are too focused on Full Motion Video (FMV) platforms with kinetic capabilities. There must be a balance between project and protect. Arguably, 95% of what FMV produces results in clutter on the editing room floor. The reason for this is that FMV is most often used for force protection or to provide a given headquarters with greater definition on what is occurring on the ground around one of its sub-units. FMV is largely not being used to find and understand the enemy, in support of the production of actionable intelligence, in preparation for named operations - as it should be.

How do we wean people from FMV as force protection (FP) in order to facilitate ISTAR operations which find and understand the enemy? First, we remind people that the ISTAR plan has a function and a purpose. Second, we educate commanders and staff on what constitutes an ISTAR asset. FMV used in the FP role over a Squadron on the ground is adding one ISTAR asset to the 100 ISTAR assets already operating in the given area. It facilitates a HQ's understanding of what is happening on the ground during a current operation; but it is redundant and does not likely contribute to understanding the enemy or to satisfying the Commander's Critical Information Requirements, the Intelligence Collection Plan or the Primary Information Requirements, Information Requirements or Indicators of an ISTAR Plan. To illustrate this, in terms we all understand, Col Bell used the Crawl, Walk, Run analogy that we use for training and exercising. This construct made the proper use of ISTAR assets to find and understand the enemy very clear:

Crawl. Support to Troops in Contact (TiC) or FP support. If FMV ISTAR assets are placed over troops on the ground for the purposes of facilitating a HQ's situational awareness or providing force protection then that HQ is crawling with its ISTAR capabilities. This is also true if ISTAR platforms with kinetic capabilities are being used to provide FP ISO troops on the ground or if ISTAR assets are redirected from a FIND / Understand operation ISO a TiC. Using Attack the Network style C-IED operations as an example, Crawl Ops would see IED layers struck by kinetic platforms - it would not see the enemy followed or tracked or their colleagues identified (with their subsequent activities observed, assessed, and understood).

Walk. This phase of ability sees:

1. ISTAR assets used to gain a greater understanding of the enemy's pattern of life (PoL);

2. The use of one asset in conjunction with another to develop a "sound track" in support of greater understanding. For instance, a sound track may incorporate ICOM recordings, translated and sequentially timed with the imagery of a FMV asset. Such a sound track greatly improves the understanding of what a commander is observing. The Walk phase starts to see ISTAR coordination as the sensor to shooter link - resulting in operations being prompted by what is being observed (vice observation being prompted by operations). In the Attack the Network analogy this phase sees kinetic ISTAR operations against several levels of the network which has a far more expansive impact on enemy operations.

Run. This phase starts with several collection assets being used to corroborate each other and results in a deep understanding of enemy operations. PoL is developed, several levels are tracked and PID maintained over an extended period of time (as necessary). Individuals are identified and their specific roles in the network are understood. Ultimately, decisions are made regarding the nature of the desired effect on the network and targets are processed for a kinetic effect and other targets processed for search and seizure. This understanding results in a named operation designed (at the appropriate level) to have a lasting effect across several degrees of separation from the IED layer. The resulting cordon and search sees several enemy personnel placed into the host nation judicial system where they are processed, in turn resulting in actionable intelligence - prompting future ISTAR operations - providing an understanding of other cells or facilitators. This process is jointly driven by the G2 and G3 staffs. Units that are running with ISTAR use 80% of their ISTAR platform operations to increase understanding of the enemy, to generate knowledge, vice to conduct force protection or generate raw data. This is done with a heavy emphasis on corroboration with multiple assets cueing one-another, as necessary.

Socialization. This entire process can be facilitated by raising the level of understanding of the importance of a sound track. We raise the level of general education to socialize the idea that a sound track brings understanding and brings a given ISTAR asset from the level of tactical support to the level of operational effectiveness. This sound track can be found in the form of ICOM provided information corroborating imagery to timelines or the identification (through some other means) of the enemy's intent. This results in the submission of a mission specific shopping list to be used as ingredients in a given operation's desired effect.

In order to see these advances, direction is critical. The unit ISTAR coordinator and the Commander must both buy into the process outlined, above. To remove ISTAR assets from the FMV FP role the commander needs to know where to accept risk and why. The staff must accept that ISTAR platforms do not exist to increase their understanding of friendly activities. CCIRs (that are not night orders and feed the intelligence process) must be generated along with a current and relevant ICP and ISTAR plan. These staff products are not long term documents which can be written a single time for an entire deployment. They are mission / operation specific and must be constantly updated to maintain their relevance.

Overall we found the FIND conference very beneficial and informative. If nothing else, it showed how our issues are not dissimilar from our Allies.

Editor's Note: These foreign conferences are invaluable in providing new perspectives to challenge our perceptions. Also, it offers rare insight into the challenges faced by Allies. The Armour School will continue to seek out opportunities like this one and will endeavour to enable the participation of the Regiments.

ISTAR is a particularly problematic issue for the reasons outlined here and a number of others. There is no Canadian ISTAR champion, which results in spurts and stops among other issues. While the Armour Corps tends to think of itself as the de facto "owner" of ISTAR, there is a strong desire by other Corps/Branches to get involved, which needs coordination. Efforts this year in the Directorate of Army Doctrine and the Division HQ should lead to unity of effort in the coming year.

Mounted Reconnaissance Tactics, Techniques, and Procedures
By MWO D.L. Cobbett

MWO Cobbett is currently the Tactics Troop MWO at the Armour School.

Within the last decade, the focus of the Armour Corps has shifted significantly from tank to reconnaissance. In order to support this shift staff at the Armour School dusted off all available reference material for reconnaissance operations and drafted the Mounted Reconnaissance Tactics, Techniques, and Procedures (TTPs) publication which was made available in a "final draft" format in 2003. Since that time, the publication has remained the main source of reference material for all armour reconnaissance training within the Corps.

Through its extensive use in training over many years, there have been many shortfalls identified in the publication: the TTPs have evolved with lessons learned; much of the content is platform or equipment specific; and in many cases there is simply insufficient material or content that is missing entirely. In 2007 reconnaissance doctrine was revitalized with the publication of *Ground Manoeuvre Reconnaissance*. Ultimately it was this change in doctrine that emphasized the immediate requirement for a new version of our TTPs.

In the fall of 2009, Tactics Troop at the Armour School started a complete rewrite of the Mounted Reconnaissance TTPs. Due to the limited number of personnel available to participate in the initial draft, the project was estimated to take between 18 – 24 months to complete. Work on the publication commenced immediately with the research of existing publications, liaison with other elements, an analysis of end course reviews to determine gaps in the material covered on courses, and a review of lessons learned.

The importance of this manual cannot be overstated. Although it is largely "built" from other doctrinal publications, it is the one-stop publication for recce operations at the troop and patrol level. It has proven essential to the training conducted at the Armour School and throughout the Corps. Size matters and the girth of the 2003 TTP was replicated to ensure that the same level of detail was provided.

The initial draft is tentatively titled The Armour Reconnaissance Squadron in Operations, Mounted Reconnaissance Tactics, Techniques, and Procedures, and was completed in August 2011. An electronic copy was made available to all the Regiments in the Corps for the purpose of conducting a review and providing feedback to the Armour School. With review of the draft complete, it is en route for translation with full distribution expected in 2012.

A similar project has commenced at the Armour School in regards to the Tank TTPs. With the procurement of a new fleet of tanks for the Corps and a renewed focus on tanks in operations, the need to review legacy tactics, techniques, and procedures has become readily apparent. An outline has been submitted and approved, with an expected completion date for the initial draft being the end of November 2012.

Editor's Note: The Recce TTPs exist in English Only on Documentum with the French version available shortly. Building on this success, Tactics Troop has started work on the tank TTPs with a view to producing an English draft as early as December 2012. For additional information about either TTP, contact MWO Cobbett at the Armour School.

The Reconnaissance Troop of the Future
By Capt P.L. Nicolas

Capt Nicolas is currently employed at the Armour School as the the Tactics Troop Leader.

In a near future we will see the Coyote leave our lines to end up beside the Lynx and the Ferret on a cement pad in front of our Regiments. Even though it was not the greatest reconnaissance vehicle, all Armour Corps Crewman learned with great flexibility and knowledge how to transfer their skills from the Lynx to the Coyote. I have to say that our flexibility and knowledge will be greatly challenged with the introduction of the new vehicles, especially with the Tactical Armoured Patrol Vehicle (TAPV). The introduction of the TAPV and the LAV Recce will bring many challenges to the reconnaissance troops on how they will conduct their operations. The new vehicles will provide a great deal of new capabilities but some of their limitations might provide challenges in conducting the primary role of medium reconnaissance. Also, with a mixed fleet there needs to be an analysis of the vehicle configurations within the troop. Some options aimed at best employing the new vehicles while minimizing negative impacts are presented with a view of catalyzing debate within the Corps on the way ahead.

TAPV

The TAPV will be a multi-trade vehicle with Infantry and Armour being the primary users. The TAPV will also be used by other enablers ranging from CIMIC to MP. Crew survivability was the paramount factor. With our transition out of Afghanistan we are left to wonder if such emphasis was pertinent to a “the war” vice “a war” approach. We are looking to have either a 4x4 vehicle similar to the RG31 but slightly bigger, or a 6x6 Cougar (school bus type). These vehicles are closed-cabin with a RWS system. Occupants will be strapped to their seats with a 5 point harness that will hinder movement in and out of the vehicle, and there will be no ability to have 360 degree visibility since the RWS will basically be the only way to ensure local protection unless the crew is dismounted. The TAPV’s off road mobility is expected to be limited in comparison to the Coyote or LAV III although it will be expected to work alongside the LAV Recce. As such, the troop’s ability to conduct any off-road movement or zone recce may be limited. The ability to manoeuvre and use ground for protection while finding the enemy may pose a greater challenge. It is my opinion that the TAPV may prove to be extremely challenging in its employment as medium reconnaissance vehicle; it appears to have a primary focus on troop carrying and protection.

LAV Recce

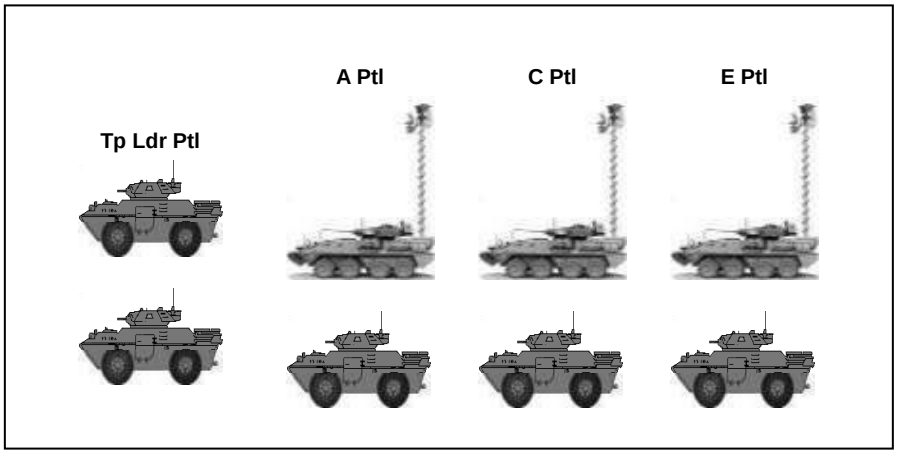
TAPV’s counterpart, the LAV Recce, will increase our capability for surveillance within the troop. It will be equipped with a surveillance system that can be fixed to a mast or tripod and is capable of use while on the move, a major improvement compared to the Coyote. Options were consider implementing a wireless system, but the need to change batteries constantly was not suitable for the scope of employment. Its surveillance system will also be able to record data that is being seen and send it through to another station that has the same system. That being said we are coming to the same problem our predecessor had twenty years ago when the surveillance system of the Coyote could record data but nobody outside of a Coyote could see it unless a runner was employed. Also, the LAV Recce will receive a satellite-on-the-move (SOTM) communications system that will enable substantially improved range. The vehicle will be bigger than the Coyote, posing a greater challenge to accomplishing medium recce tasks. From the Ferret, to the Lynx, to the Coyote, and now we are consistently procuring vehicles that are larger than their predecessors. The LAV Recce undoubtedly provides greater

surveillance capability with it's new suite of electronics, however due to its size and profile it will make it that much more challenging to remain stealthy while finding the enemy on a conventional battlefield.

Troop Configurations

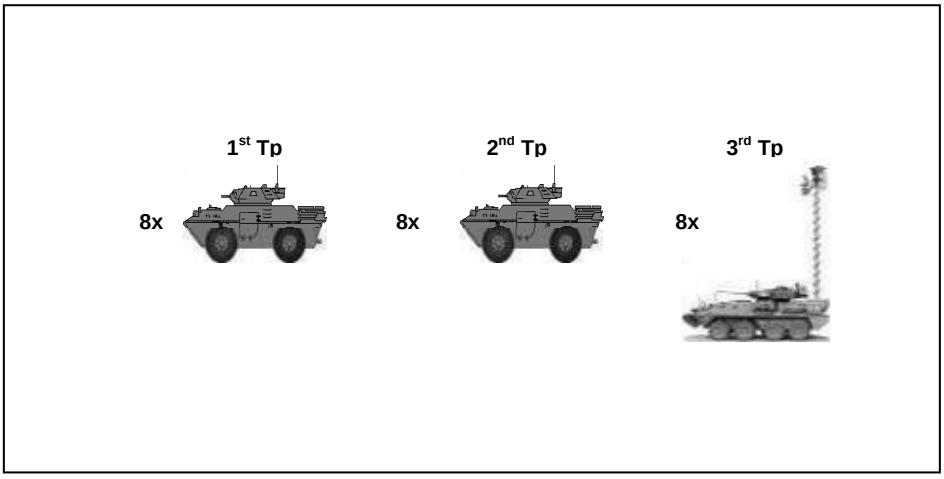
Although distribution plans and force employment structures will be drafted and issued, it will ultimately be the responsibility of tactical commanders to decide on how they employ their personnel.

Option 1: (This is the model that is being used for distribution of the fleets) Each troop would be five TAPV and three LAV Recce. The SHQ would have two TAPV, one LAV UP and one Bison CP. The troops would have one LAV Recce per patrols and two TAPV for the troop leader's patrol. It is not yet clear how the troop leader, if mounted in a TAPV, will manage information from his patrols. Also, off road capability will be disproportionate within the troop and even in the patrols.



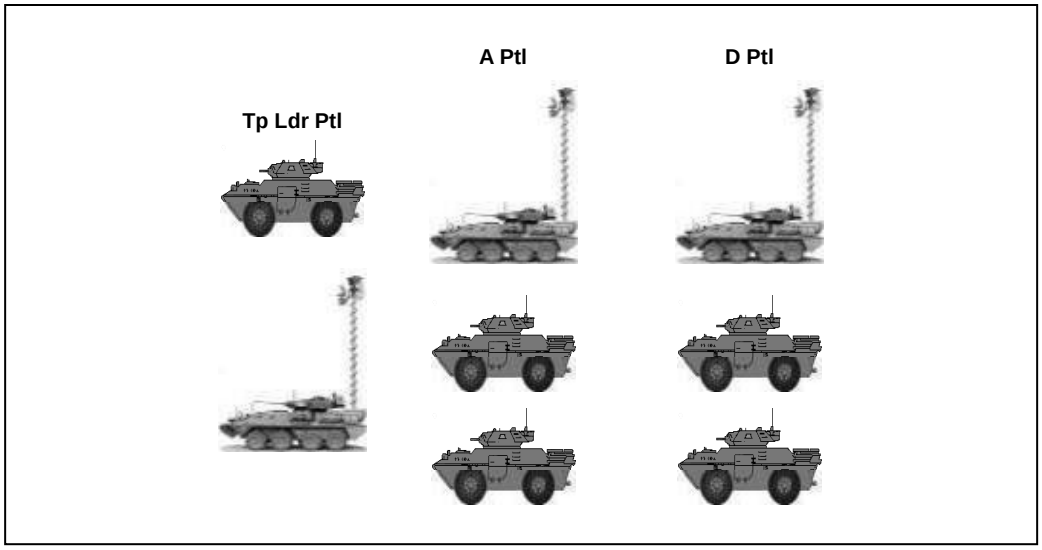
Graphics are for illustration purposes only and are not indicative of actual TAPV or LAV Recce models.

Option 2: One full troop of LAV Recce and two full troops of TAPV. The extra LRSS would be given to SHQ in order to receive any feed that is being sent by the surveillance (LAV Recce) troop. The LO could then also be employ if needed to increase security around the CP with the surveillance system. The surveillance troop would detach patrols to other tps in support of other recce operations (e.g. screen). The capacity for the Squadron to receive the feeds almost real time would then create the possibility for greater accuracy in the Brigade and Battle Group planning process. The two TAPV troops would then be able to conduct pure reconnaissance operations and not be employed as a surveillance asset.



Graphics are for illustration purposes only and are not indicative of actual TAPV or LAV Recce models.

Option 3: Reshape the actual troop format. This option sees two patrols of three cars and the troop leader patrol with two cars. The two patrols would each receive one LAV Recce and two TAPV. The troop leader patrol would have one LAV Recce and one TAPV. This would ensure maximum communication capacities within the troop and the troop leader to SHQ. Three car patrols would increase protection and all patrols would have the surveillance capability of the LAV Recce. With this configuration, the troop leader's patrol could also be employed in a surveillance tasks if required. This option best leverages the new technology and also keeps the troop leader actively involved, consolidating and analyzing information coming out of his troop.



Graphics are for illustration purposes only and are not indicative of actual TAPV or LAV Recce models.

To conclude, there are a number of challenges ahead. In addition to the technical and tactical challenges posed by the actual vehicles, the Armour Corps will need to determine the best structure to support recce operations. While vehicles such as the TAPV may fall short of our expectations, there is little doubt that Recce Crewman will make it a valuable addition to the battlefield.

Editor's note: The composition of recce troops will be a challenge due to the number of vehicles, their capabilities, and the expectations for future integration into ISTAR systems and technology. The options presented here are merely the start of dialogue aimed at determining a workable solution that is within the Armour Corps' means. Prior to the commencement of field trials – which are effectively the end of the process – I encourage the Armour Corps membership to send us your comments and suggestions.

Power Hungry:
The Requirement for APUs on Canadian AFVs in the CoE
By Capt R.A. Cooper

Capt Sandy Cooper was BC C Sqn 2 R22eR BG for Op Athena Roto 7 in Kandahar, Afghanistan from March – October 2009 and is currently employed as Adjt LdSH(RC).

From the early days of the Second World War, mechanized warfare has been our military reality. This has brought military forces not only an exponential increase in tactical mobility in protection, but a commensurate growth in the "logistical tails" of modern armies. Over the last seven decades, not only have armoured vehicles become far more capable than their predecessors, they have also consumed geometrically increasing amounts of power. Even when power-saving innovations such as turret electric drive replace electric/hydraulic systems, additional capabilities are often added that negate any power savings.

Even in the Afghanistan Theatre of Operations (ATO), armoured vehicles of all stripes play an important role in operations. The 360° threat that we face now and for the foreseeabl e future means that safe areas outside the wire are almost non-existent. Soldiers must now maintain vigilance during all phases of operations. For mounted/mechanized operations, local security is very complex, as armoured platforms lack the in-depth situational awareness of dismounted forces due to their separation from the population and the unavoidable noise signature of armoured vehicles.

On deployed operations, while moving, AFV power needs are adequately met via the main engine. However, once manoeuvre stops and a leaguer or harbour is adopted, the security requirement remains, which generally means that at least some turret systems must remain operational on tanks and LAVs. In addition, C2 systems such as radios and Situational Awareness System (SAS/Canada) or Blue Force Tracker (BFT/USA) generally need to be kept ready. In inhospitable environments such as extremely hot or cold AOs, crew comfort and serviceability of turret electronics are a concern and heating/cooling systems are required. Power demands can often increase at night with the additional requirement for thermal and image intensification systems to be active.

In Afghanistan today, what this means is that most AFVs have their engines running at least 20% of the time while deployed in leaguers. Some vehicles, such as command variants of the LAV 3 or MRAP family, must keep their engines at idle or high idle for the duration of the operation without ever shutting down completely. This is not only inefficient from a logistics and environmental perspective, it is also tactically dangerous.

Past Canadian AFV projects such as the Leopard C2 upgrade, the Coyote and the LAV III hoped to rely on battery power for silent watch and surveillance. Unfortunately, battery power and endurance were not enough for operations and systems at the time and continue to be inadequate. Coyote employment still dictates that the engine either has to be running or an external power source must be utilized as part of OP routine. Batteries or hydrogen fuel cells may be the wave of the future, but they are inadequate for both immediate and mid-term needs.

These are but a few examples of why the Canadian Army should incorporate under armour Auxiliary Power Units (APU) on all AFVs we expect to operate beyond 2015. As a bare minimum, all of the Leopard 2 family, all command vehicles (LAV, Bison, M577A3, etc.) and all recce vehicles (Coyote/TAPV) should be equipped with APUs as an operational necessity. This paper will endeavour to provide a brief analysis as to why APUs are required from a tactical, administrative, mechanical, and cost-savings perspective. Like the five operational functions, many of these requirements overlap, and the language of *Command, Sense, Act, Sheild*, and *Sustain* will be used to reinforce the overarching arguments.

Tactical

The tactical advantage gained through the use of APUs can be considered in many ways, but will primarily be illustrated in this paper through its potential employment on the Leopard 2 family of vehicles. First, when stationary in a leaguer, it is necessary to have a fully warmed-up turret in order to use the main gun or coaxial MG in a timely manner. Turret power uses a lot of energy, especially when the gun stabilization system is on. Currently, tanks in leaguers are generally left in "stab ready" mode if they are on watch. This takes less power than full stab, but still uses a significant amount of electrical power. Thermal sights also draw a lot of energy and generate a lot of heat. This heat increases the strain on both the onboard systems and the crew. All AFVs in leaguers maintain radio listening watch as a minimum, and Canadian TCCCS radios use a large amount of energy. The tanks are fitted with a cooling vest system, but this cannot be used when the engine is off due to the high power requirements and lack of surplus power. Currently, there is no cooling system for the electronics on the tank, though this is being examined. In fact, such are the capabilities and power demands of modern tanks and AFVs, the German firm ESW estimates that a minimum of 15 KW of output is required to maintain an effective silent watch.[1] As it stands right now, tanks must be run for an average of 15-20 minutes every 90-120 minutes in order to ensure a continued charge and ability to maintain radio listening watch. An APU would provide increased readiness by having the turret able to react to contact more quickly (*Act)*; allowing the thermal systems to be used when stationary by day and night (*Sense/Sheild)*; ensuring radio communications are maintained *(Command)*; and by allowing crew members to use their cooling vests in warm environments and heaters in cool ones *(Sustain)*.

Another tactical advantage that is often overlooked is that an under armour APU significantly reduces both the noise and thermal signatures of vehicles that are stationary for extended periods of time.[2] While this is not a huge advantage against a dismounted foe, it becomes significant when fighting a peer, near-peer or other mechanized opponent. There are many existing APUs that provide quiet power generation of less than 50 dB at 7m, and technology is being developed that will assure silent power generation at 50m.[3] This reduction in noise over the engines of AFVs is significant, and aids in both avoiding detection *(Shield)* and detecting the vehicle movement of others *(Sense).*

Maintaining an under-armour APU allows for power-generation while protecting the source of power from both direct and indirect fire *(Shield).* For an example of why this is important, one only needs to look at the American experience during the invasion of Iraq in 2003 (Operation IRAQI FREEDOM/OIF). During OIF 1, a number of US M1A1 tanks were equipped with turret mounted external APUs (EAPU) with no armour protection. This caused a number of vehicle kills from small arms fire. From Jane's Armour and Artillery: "Externally-stored items were highly vulnerable to small arms fire and some vehicles were lost after burning external APU material and/or packaged POL products dripping down into the engine compartment and catching fire."[4] For this reason, EAPUs should not be considered for the Canadian AFV fleet.

Administrative

APUs provide massive advantages over using the main engine. While deployed in leaguers, tanks on TF 1-09 averaged 60-120 L of diesel per day, Command LAV 3s averaged 80-120 L of diesel per day, and LAV Infantry Section Carriers (ISC) used about 20 L per day. For a combat team of several dozen vehicles, this significantly increased the administrative requirements of the echelon. American studies have suggested that switching all M1 Abrams tanks (and only them) to APUs would save a US Heavy Brigade Combat Team an average of 16,500 L of fuel and save $86,000 USD per day.[5] While American vehicles use JP8 fuel instead of diesel, the cost-savings to a Canadian unit or formation would still be significant. The reductions in fuel requirements translate to the ability to conduct longer operations and exercises or to save significant amounts of money. APUs

[1] ESW Response to PWGSC Solicitation No. W8476-080001/A, dated 22 May 2008.
[2] Though a dismounted and dug-in APU would provide even better noise-reduction and a smaller heat-signature, it completely negates the mobility advantage of mechanized forces. For this reason, this type of generator support is not optimal for mobile, tactical forces at the unit-level and below.
[3] Dr. Edward T. Schafer, presentation to US Army 10th Annual Science and Energy Technology Conference dated 21 April 2009, slide 15.
[4] *Jane's Armour and Artillery*: "General Dynamics Land Systems M1/M1A1/M1A2 Abrams MBT." 19 Mar 2009. URL: http://www4.janes.com/subscribe/jaa/doc_view.jsp?K2DocKey=/content1/janesdata/yb/jaa/jaa_0084.htm@current&Prod_Name=JAA&QueryText=%3CAND%3E%28%3COR%3E%28%28%5B80%5D%28+M1+%3CAND%3E+Abrams%29+%3CIN%3E+body%29%2C+%28%5B100%5D+%28%5B100%5D%28+M1+%3CAND%3E+Abrams%29+%3CIN%3E+title%29+%3CAND%3E+%28%5B100%5D%28+M1+%3CAND%3E+Abrams%29+%3CIN%3E+body%29%29%29%29
[5] Schafer, slide 16. Note: US Army uses JP-8 for all vehicles, which is approx. $20 USD/gallon (3.86L)

developed for the civilian market that are similar in capacity to military APUs burn 700ml/hr,[6] a huge reduction over the engines of all AFVs in our inventory. The benefits to the *Sustain* function sell themselves.
Mechanically, APUs also have significant benefits. Engines of all types wear with excessive use, and power packs for AFVs are notoriously difficult to fix. They are designed for a battlefield expedient quick change out, and thus have both the engine and transmission incorporated into each other to ease this rapid transition. The down side to quick replacement is that power packs are more difficult to fix than vehicles with separate engines and transmissions. If APUs are used to augment main engines, wear and tear will be reduced significantly on the engines of the AFV fleet. Due to their small size and relative simplicity, they will be easier and faster to fix than their larger counterparts. In extreme weather conditions such as those faced in Afghanistan, engine wear becomes an even greater factor. With massive amounts of dust and heat levels topping 65° Celsius in the summer, a reduction in engine wear will increase combat effectiveness exponentially. For example, a broken tank requires either another tank or an armoured recovery vehicle (ARV) to recover it, thus the loss of one platform potentially becomes two. Maintaining a high vehicle readiness rate becomes even more difficult on operations of five days or longer, so anything to reduce the burden on equipment is welcome (*Act/Sustain)*.

Currently, there are a number of companies that produce suitable under-armour APUs without the requirement for major vehicle modifications. ESW has both 8KW and 17KW APUs that can be mounted on a Leopard 2A6M with alterations to the battery storage and back deck of the tank. The ESW APU is 38 cm x 48 cm x 60.5 cm and weighs approximately 100 kg. It can be fitted to the right rear side of the Leopard 2A6M by removing two batteries and creating an entry point for easy maintenance.[7] Another option is a General Dynamics Land Systems gas-turbine under armour APU which is mounted to all M1A2 SEP in US Army inventory.[8]

It is understood that refitting the majority of our AFVs with APUs will not be without cost. Civilian companies claim that an APU for an 18-wheeler pays for itself in less than two years with normal use.[9] We can expect military APUs to cost more than their civilian counterparts, as modifications to the armour to increase internal volume is a difficult and time consuming business. Still, given that the projected service life for most Canadian current and forecasted AFV fleets is until 2035, it is likely an investment worth making.

Conclusion

Currently, both the TAPV and Tank Replacement projects are examining the inclusion of APUs into the final service vehicles. This brief analysis has demonstrated that APUs make AFVs quieter and more tactically aware, thus increasing tactical survivability. In addition, there are significant user-level financial benefits and the use of less fuel ensures that longer operations and smaller administrative echelons are possible benefits.

Based on past operational experience and likely future requirements, the inclusion of APUs on future vehicles would be a wise decision. In addition, command vehicles (especially LAV variants) should have this capability, as the benefits clearly outweigh the costs.

Editor's note: Silent watch capabilities are now prominent in a number of procurement projects such as LAV UP and LRSS UP, but unfortunately not the Leo 2.

[6] *Willis APU Web Site*: http://www.willisapu.com/home/index.php?site_config_id=110&page_selection=2297&aid=, dated 4 March 2010.
[7] ESW, slides 6-8.
[8] *Jane's* and MAJ Ed Leathers, USA. "TARDEC Presentation to Industry." 3 Nov 2004, slide 6. Of note, the front right nose of the Stryker/LAV 3 has 0.2m3 of space for an APU, which is roughly equivalent to the space achieved in both the Leopard 2A6M and the M1A2.
[9] "Cummins Comfortguard APU System" Brochure dated 2007, page 3.

Persistent Surveillance System Development
By WO M.M.D. Sevigny

WO Sevigny is currently employed as the Technical Troop WO at the Armour School and is the PSS Team Leader.

The persistent surveillance system (PSS) has been on the Canadian Forces' equipment list for close to three years now, but hardly anyone has seen it in action up close. The PSS has been deployed in the theatre of operations in Afghanistan and has been used for domestic operations as well, such as the Vancouver Olympic Games and the G20 Summit in Toronto in 2010.

The PSS is also one of the latest ISTAR (Intelligence, Surveillance, Target Acquisition and Reconnaissance) acquisitions, and it makes it possible to gather information, in the form of videos or photos, in its assigned surveillance sector. With the addition of this upgraded system, the coverage provided in a designated sector is all the more in depth.

The PSS's various features include the Aerostat (the balloon), which requires only a minimum amount of maintenance and can remain in the air for long periods of time. Beneath the balloon, an aerial vehicle carries a high-resolution camera that makes it possible to conduct observation in colour under ideal conditions. The camera is also equipped with another observation system that can be used under more challenging conditions and at night. It also has a laser range finder, which can provide the coordinates of a point on the ground, and a laser pointer that can locate any type of target. As such, it is a precious tool for ground operations in the area covered by the PSS. However, even though the balloon flies relatively high in the sky, its observation range depends upon a number of factors such as the terrain where it is being used, the temperature, the air traffic and the activities of the other aircraft in its sector. Weather conditions present operators with the most challenges.

Left: Tracking tower. Right: Squire MM1 Radar. (Photos by WO M.M.D. Sevigny)

The second component of the PSS is the observation and tracking tower, which is able to observe a sector with a daylight camera, a thermal-imaging camera, and a laser range finder. Its main advantage over the Aerostat is that weather conditions do not have as great an impact on its operation. It is 30 m (100 ft) high when fully extended and is able to cover the terrain in the immediate vicinity of the base or take over for the Aerostat if it has become too difficult to conduct observation with it as a result of challenging meteorological conditions or sight lines.

The third component of the system is the Squire MM1 radar. It is small and portable and can conduct a sweep to track various movements in its surveillance sector. It works closely with the tower system, displaying what it has detected on the ground on the monitors used to operate the tower camera.

All of the operations that enable the components to function are performed from a control station on the ground. The information gathered by the components is sent to a computer. The computer is able to store the data (images or videos) and prepare reports that are transmittable to the various command posts that require the information.

Although the system got off to a rough start when it first arrived in theatre, it has since taken on an important role and become an integral tool, enabling us to maintain a high level of security in the area surrounding the FOBs where it is installed. There were several main challenges that initially had to be overcome in theatre. It was difficult to train the operator in the field with the minimum amount of expertise that the first team of Canadian soldiers had acquired from the company that created the system. It was also challenging at first to establish solid communication with the CPs on the ground so that the information collected by the PSS could be shared. We also had to determine what the system could do to optimize its additional operational and technological uses for the soldiers deployed in the field.

The Armour Corps has inherited the task of providing training and developing people's expertise on the PSS. It is preparing the operator course and developing TTPs for domestic operations and all other scenarios in which we would need such capabilities. We should also implement a new practice so that the system is used during our conventional warfare training. Its use should be planned, and validation will be necessary to evaluate the benefits that it brings.

Left: PSS Aerostat (balloon). Right: PSS Deployed on operations. (Photos by WO M.M.D. Sevigny)

The PSS is a piece of cutting-edge technology and it has great potential to be used in various ways. It will no doubt take on an increasingly prominent role during missions, domestic operations and even overseas operations. The civilian engineers are already coming up with new ideas for maximizing the equipment's potential. Higher-performing components are in development and a number of software updates have been installed so that soldiers have a high-tech tool that can perform the role for which it was designed in a contemporary operations context.

Editor's note: Under Force 2013, PSS will become an Armour Reserve task. The analysis is currently underway to determine the distribution and continuation training requirements of this powerful system. In addition to developing tactics, techniques and procedures (TTPs), there is tremendous interest in determining how this system can be best employed, both in Canada and on expeditionary operations.

Persistent Surveillance System: Employment Considerations from an Armour Reconnaissance Perspective

By Capt T. Dossev

Capt Ted Dossev was employed as the TFK ISTAR Planner for the latter half of TF 5-10's rotation. He is currently employed as the 2IC A Sqn, RCD.

Three Persistent Surveillance Systems (PSS) were deployed for the duration of TF 5-10's employment in Kandahar through 2010 and 2011. These systems were a challenge to employ and integrate in the larger collection plan because they posed some unique employment considerations.

PSS is a simple concept with many advantages. A blimp is tethered to a ground control station and mounts high quality optics. The system is very much like a mast mounted surveillance suite (MMSS), but with much better elevation. From the perspective of a commander, the PSS is like a very good UAV with a very long flight time and a fixed vantage point. UAVs (and particularly the armed ones) were consistently the most in demand surveillance asset in the theatre so PSS offered a good alternative to these platforms. Alternatively, the PSS could be focused on pattern of life – movement of the local protection and route scans – freeing the UAVs to observe in "depth". Finally, with the exception of some weather and technical limitations, the PSS were nearly always flying so they were always available.

PSS were also always near the tactical infrastructure (TI) since they were flown from within the FOBs and COPs. The surveillance overlay familiar to reconnaissance soldiers in an observation post line was represented in this case by overlapping concentric circles centred on the TI. For these reasons, the PSS became an invaluable command, sense and shield tool for commanders and were ultimately sited after careful deliberation by TF Kandahar HQ.

Perhaps most importantly, the PSS was visible from the ground and became a deterrent to enemy action. Again, very similarly to the MMSS, the casual observer on the ground could not say where the camera was oriented. The effect was that those with nefarious intentions had to assume that if they could see the balloon, they could be observed even if the operator was scanning elsewhere. This deterrent effect became very obvious during dismounted patrols shortly after the PSS were first deployed. When a US owned aerostat tether snapped during a windstorm and the entire aerostat with optics suite was lost, we observed a spike in enemy activity in an area that had been quiet for months.

Thus begins the inevitable comparison with the American solution – The Persistent Ground Surveillance System (PGSS). [1] The US Army has a comparable system, but theirs is so much bigger that it mounts multiple modules[2] and can see twice as far as the smaller Canadian cousin. Operating at two to three times the elevation of the PSS, the US system was also out of small arms range of all but the most powerful man portable weapons. Despite its technical superiority, the PGSS was only marginally more effective because it was operated by civilian contractors. These operators were not reconnaissance crewmen trained to observe and interpret tactical indicators or even report what they saw like soldiers do. Flanking TFs expended much time and effort training their operators (in theatre no less) to achieve the same results as PSS operators. Furthermore, due to a multitude of contractual limitations, repairs took much longer and civilian operators required much greater degrees of protection than soldiers did.

Ironically, the size of the PGSS became a disadvantage when fielding an aerostat in all but the largest FOBs. The US system required the equivalent of an HLS while the Canadian PSS needed only about a quarter of the footprint. With respect to replacement parts, the Canadian supply system was lightning fast partly because our parts were smaller and lighter and did not require multiple lifts in C 17s to be deployed. Regardless of nationality, surveillance aerostats demonstrated some inherent disadvantages and serious limitations.

Perhaps the greatest limitation was that moves and deployment were necessarily very deliberate and usually final. TI was constructed or painstakingly expanded to accommodate these systems as they required large level pads for launch and

[1] One caveat for the Corps is that there is little analogy to the initial employment of the Coyote and MMSS because 15 years ago no one else had vehicle mounted MMSS. The US Army only recently began fielding a 3m observation mast with integral GCS, MSTAR radar and generator mounted on what amounts to a boat trailer. This system drew little interest from field commanders because it did not come with a trained crew and also because the PGSS and PGST carry superior optics and much larger payloads.
[2] Not all capabilities are described in open sources.

recovery. [3] From the logistical and mobility standpoint, TI expansion or construction necessitated the commitment of engineers, convoys and heavy equipment to lift the GCS. The PSS would also require a large quantity of helium to be refilled. Another unexpected side effect was that all aerostats required a Restricted Operation Zone (ROZ) of varying radius and altitude to avoid collisions with aircraft. In one instance, the options were to expand TI into a lake or have to choose between an HLS and the aerostat.

From the tactical perspective, the areas of greatest enemy activity were usually concentrated along the unit and sub-unit boundaries (seams) and were farthest from the TI. As a result we often had multiple platforms observing these areas from multiple vantage points though often at the limit of their observation range. Thus the tactical recommendations for siting PSS came from the battle space owners as well as collection managers like the ASIC and ISTAR Coordination Cell. Deploying the PSS became a very deliberate effort, perhaps more analogous to an artillery battery taking a bound with deployment and movement decisions resting with the TF Commander. Counter-intuitively for the reconnaissance soldier, the TI location and not the observation target dictated siting. As a result of these considerations, the PSS were usually tied to the ground once deployed.

Other tactical considerations included weather and the aforementioned small arms fire (SAF). Near the end of the deployment one PSS was being patched daily. Afghanistan also has a storm season which lasts for six months. Gusting winds would push the aerostat down allowing for slack in the tether and then release the aerostat to max elevation. This sudden snap of tension on the tether occasionally caused them to break and for PGSS complete with payload to end up in neighbouring countries[4]. To overcome both these limitations, towers were employed with each aerostat. Both US and Canadian systems included a semi-permanent tower, similar to cell phone scaffold tower, compatible with the GCS and mounting similar optics. These Persistent Surveillance Towers PSTs had reduced range because of their relatively lower elevation but could compensate for an aerostat which required repair due to weapons fire or was pre-emptively moored to protect it from wind gusts[5].

Compared to UAVs, the PSS had two major disadvantages and two minor advantages. First, PSS had no image analysts (IAs) as part of the crew. Secondly, they have a fixed vantage point. A UAV can circle or even follow a target while the PSS line of sight can be easily obscured. Both these limit PSS usefulness in establishing positive target identification (PID). Conversely, the PSS with their PSTs are capable of operating in worse weather than UAVs. Secondly, PSS can remain aloft for 23 hours each day compared to half that for smaller UAVs though this gap is quickly closing as new UAVs are deployed.

Finally, PSS should be compared to the reconnaissance squadron in observation, mobility, protection and firepower – the cornerstones of the Corps in its reconnaissance heavy role. While the PSS can see farther and better than an individual Coyote, the blimp cannot look in nearly as many directions or from nearly as many vantage points. The vehicle mounted crews can also manoeuvre (covertly if required) to define a target. The vehicles have the advantage in endurance in that they do not require helium refills every 24 hours or to moor for adverse weather. In mobility, the squadron is easily superior given that PSS cannot realistically move but there is one caveat. Considered together with protection, the vehicles are much more vulnerable to IEDs even while the armour affords superior protection from SAF. In terms of force protection, for the same number of eyes, the PSS has a gigantic footprint in a FOB and required additional troops to be defended. Lastly, while both PSS and vehicle mounted patrols can employ indirect fires and CAS, only the reconnaissance squadron has direct fires or the ability to vary its level of force or to employ non-lethal options. In comparison, the two systems form complimentary tools in a toolbox, but one could not be used to replace the other.

In conclusion, the PSS are very suitable for surveillance and force protection – the shield function. They are far less useful for reconnaissance and target acquisition to include definition and PID. The latter of these are traditional strengths of the armoured reconnaissance squadron in its sense and act functions and its capacity to operate in dispersed, simultaneous and diverse operations. PSS incorporate some challenging employment considerations as demonstrated during a limited period of time in a limited theatre of operations and have never been truly tested in the kinetic end of the spectrum of operations. The versatility and flexibility of these systems is ultimately more appropriately attributed to its operators and their experiences in a manoeuvre arm.

[3] Land use agreements, minefield clearance certificates and contracts with local nationals for HESCO construction were just some of the added hurdles.
[4] The US balloons were much more vulnerable to weather effects.
[5] PSTs offer an interesting compromise. They need a smaller footprint than a PSS, can be employed separately, mount better optics than MMSS but also have MSTAR radars. Max elevation is approximately an order of magnitude greater than MMSS. They use the same GCS as the PSS and are therefore nearly as immobile.

2011 Army Instructor Gunner Conference
By Sgt C.R. Keith

Sgt Chris Keith is currently serving at the Armour School as a member of the Army IG Team.

The Armour School, as the Center of Excellence (CoE) for mounted direct-fire weapon platforms, recently hosted the 2011 Instructor Gunner (IG) Conference from 19 – 21 October 2011. This was an accomplishment in itself as the conference has not been held the previous two years due to limited demand from the units. Understanding the importance of the conference and the need to address a number of gunnery issues, the Army IG Team pushed hard to attract maximum participation from across the Army. The 2011 conference had a three day agenda: day one included unit briefs and IG issues, allowing all participants an opportunity to discuss problems and shortfalls, and generate some debate and solutions; day two focused on the demonstration of the Live-Fire Monitoring Equipment (LFME) by Krauss-Maffei Wegmann (KMW), a German defence contractor; and day three was an opportunity for guest speakers from the Directorate of Land Requirements (DLR) to provide an overview on the current vehicle projects that will comprise the Family of Land Combat Vehicles (FLCV).

The unit gunnery updates provided an understanding of the current state of gunnery training across the Army, ongoing initiatives, future training events, and several of the challenges being faced. A total of eleven unit presentations were provided representing units from each Corps as well as the Regular and Reserve components. These presentations indicated that gunnery training was continuously active and continued to succeed despite major challenges, chief among these being the limited number of vehicles available for gunnery courses. The wear-and-tear placed on equipment over the years is beginning to take its toll. The outdated LAV Crew Gunnery Trainer (LAV-CGT) is regularly being pushed to its limit. The constant process of installing and dismantling the simulation equipment has left a significant amount of gunnery trainers unworkable, with damaged parts becoming harder to replace. Also mentioned were the high operational and training tempos over the last several years leading to higher student to instructor and/or vehicle allocation, well above the standard 4:1 ratio in some cases. All in all, the message was clear: vehicle and equipment woes, coupled with high student to instructor ratios has been negatively affecting the quality of gunners currently being produced.

Two presentations given by Armour Reserve units offered different but significant challenges. Gunnery skills are gradually fading and, in some cases, barely being kept alive. This is attributed to a number issues, first and foremost being the last decade spent on the LUVW with pintle-mounted C6 gunnery. DP1 Crewman utilize the GRIT method and are not formally introduced to Burst on Target (BOT). Further, the Advance Direct-Fire Specialist (ADFS) course is not as Reserve friendly as its predecessor. ADFS is not modular and does not offer a range templating 'tool box.' The result has been fewer numbers of Reserve candidates attending the course and a loss of vital range preparation skills among many Reserve units. This leaves many units heavily reliant on their closest Regular Force unit to help plan, template, and execute their ranges. With fewer members familiar with 76mm Cougar gunnery, it is clear that there is a need to rejuvenate gunnery training in the Armour Reserve.

In addition to the briefings, there were a number of healthy (and sometimes heated) debates on a number of topics. The Army IG team discussed the possibility of a new formatted gunnery competition, similar to the old Canadian Army Trophy (CAT) in order to enhance gunnery skills and promote esprit de corps. This would be available to all Army units and initially focused on the 25mm, with room to expand to additional platforms. Discussions also included the thought of re-introducing rigid time and accuracy standards. Although this is a practice that we have long since left behind, it is being used in many armies across the world. This would lead to the more deliberate conduct of ranges and gun camps with established standards and goals. Further discussions included the employment of the IG at the unit level and the possibility of re-introducing modules into the ADFS in order to cater to the Reserve, Infantry, and Armour. Also, an enhanced module could be a possibility with specific focus on the vehicles fire control system, other turret sub system components and a more in-depth look at the inner workings of the turrets armament. Near the end, the Army IG Team informed the attendees that they had not been successful in conducting CoE visits, one of their key mandates. CoE visits are the most important function of the Army IG Team, providing the most tangible and pro-active avenue to properly monitor and enforce gunnery standards across the Army. Although there is now renewed interest, both the Army IG Team and Unit Gunnery Officers (UGOs) need to maintain better contact, providing advance notices on ranges and training events to enable visits.

2011 Army IG Conference (Photo by Sgt C.R. Keith)

The interactive demonstration given by KMW was very productive despite the inclement weather. LFMS allows an instructor to remotely monitor the actions of a vehicle crew, assess the point of aim, and observe the fall of shot during the entire engagement procedure from a monitoring station behind the firing platform. The equipment on display was installed and used on the Leopard C2 and mounted on the LAV III. The LFME gave spectators the opportunity to observe and monitor selected engagements on large viewing screens, seeing exactly what the crew was seeing. All engagements can be recorded and used in the AAR process, allowing for more in-depth debriefs with a view to improving the training value of each engagement. This privileged opportunity gave spectators the understanding of how LFME can impact the way we instruct gunnery as well as how we can possibly use this above the individual training level. Although there is work underway to procure LFME for the Leopard 2 and potentially other vehicles, the improved efficiency merits its inclusion in all gunnery training: a fact unanimously supported by conference attendees.

The conference was also fortunate to receive presentations from DLR project staff, specifically the Leopard 2, LAV-UP, TAP-V, and CCV projects. The Leopard 2 Tank Replacement Project (TRP) created some discussion in regards to the number of variants (namely the A4 Can, A4M and the A6M) and the training and operational roles each would fulfill. A number of challenges were also discussed such as the interim solution for tactical mobility implements (namely the Leo 1C2), as well as the state of the Gagetown and Wainwright training areas to receive Leopard 2. The most universally interesting presentation concerned the LAV UP due do everyone's experience with 25mm platforms and the fact that the LAV Recce will have the same turret. The LAV UP presenters gave the conference the ability to add input to include a Human Factor Engineering survey. The CCV and TAPV also garnered interest. There is great interest in the CCV due to its medium calibre capability, improved fire control system, potential hunter killer site and potential for programmable munitions. The interest in TAPV centred around its role in medium reconnaissance.

Overall the 2011 Conference was a success. With interest in the conference regained, the Army IG Team wants to build on this success and expand the conference next year. We are currently exploring an expansion of the conference length in addition to moving it to an alternate, central venue such as Ottawa, Montreal or Toronto. This would allow the inclusion of a industry field visit as well as provide the time to discuss a wide range of forthcoming gunnery initiatives like simulation and sub-calibre training devices. Inclusion of DLR is a must so that the units and users can keep up to date with the new vehicles and weapon platforms that are being introduced across the Army. Although the conference was a success and interest in gunnery may be on an upswing, ultimately the IG Conference must stick to its roots and focus on the nuts and bolts of gunnery, and that is an opportunity for the Army IG Team and Unit Gunnery Officer to discuss, debate, and improve gunnery TTPs and courseware with the overall goal of training skilled and confident gunners. This is the still the reason d'être of the conference and will remain the vital ground of the Army IG Team as they plan future conferences. .

Editor's Note: It was clear during the conference that not enough is being done to support the Armour Reserve in their maintenance of gunnery proficiency. This will be of increasing importance with the introduction of TAPV in support of the Reserves. The Army IGTM is currently reviewing the Army Direct Fire Specialist Course with a view to enabling training delivery to the Armour Reserve. Also of note is the importance of continued DLR representation. More than keeping Army IGs informed, the IG Conference provides project staff with a venue to engage with a large, diverse audience of gunnery experts.

Enhancing Gunnery Skills in an Environment of Ammunition Conservation

By Sgt F.J. Thibault

Sgt Francis Thibault is currently serving at the Armour School as a member of the Army IG Team.

If you have not felt the pinch yet, you will. At the very least, you have heard the rumblings of ammunition cost concerns and the necessity to reduce Army expenditures; ammo is not cheap and it is not going to get cheaper. Gun camps have been slowly shrinking in length over the last decade with continuation training often over-looked. A new gunner will often lack the opportunity to employ his skills on the live range between his basic gunner course and his deployment training. At the same time, the Army will significantly increase its direct-fire capability with the introduction of the Leopard 2 and Family Land Combat Vehicles (FLCV) fleet in the very near future; the latter including the LAV UP, Close Combat Vehicle (CCV), and the Tactical Armour Patrol Vehicle (TAPV). Each brings its own virtues and issues, more specifically:

- The Tank Replacement Project will field three variants of Leopard 2 tank with differences in each of the fire-control systems. The hunter/killer sight and the 120mm gun represent a significant capability increase over the 105mm gun of the Leopard C2;
- Once upgraded, the LAV III will field a much more capable, full solution fire control system for the 25mm;
- The CCV will mount a medium-calibre cannon between 25 – 35mm with a modern fire control system. This will include a hunter-killer sight and may be capable of firing programmable ammunition, including air-burst munitions; and
- The weapon system for the TAPV will be comprised of a dual mount Remote Weapon System (RWS) that mounts both 40mm grenade launcher and a C6. The grenade launcher may be able to fire multiple natures of ammunition, including a programmable fuse.

With such a dramatic increase and variety of direct-fire platforms, there will be a corresponding increase in the number of basic gunner courses, conversion courses, ranges and gun camps. When compared against the Army's ammunition rationalization, this poses a significant challenge in terms of how to produce and develop the next generation of skilled and confident gunners in an environment of reduced ammunition. The Army needs a strategy to overcome this hurdle that will not only target the short-term transitions and early growing pains but also meet the foreseeable future challenges. There exist a number of options available that can contribute to the production of highly effective crews in a cost effective manner. This article will explore many of the mitigating strategies, technologies and projects that should be explored in the next few years.

Land Vehicle Crew Training System (LVCTS)

Simulation already plays a vital role within gunnery training, following the proven doctrine of theory, simulation, and live-fire confirmation. However, the LAV Crew Gunnery Trainer (CGT), first introduced in 1999, is becoming quickly outdated and suffering from significant reliability issues. With new weapon platforms, new simulation is required. In October 2010, the new LAV Crew Trainer System project (CTS) became the Land Vehicle (LV) – CTS, to include simulators for the LAV UP, TRP, CCV, and TAPV. Ultimately, LV CTS is a vehicle simulation technology project that hopes to transform Army vehicle training, both individual and collective. LV CTS is based on simulators of multiple vehicle types operating in a shared synthetic environment. Some of the objectives include capacity up to the Combat Team Level. Part of the project will be to provide massive infrastructure on select bases across the country. Although ambitious, projects of this magnitude take time to develop and deliver; the initial operational capability is not before 2018, several years after the introduction of the FLCV fleet. While LV CTS will enable greatly improved collective training, it is unclear the extent to which it will support individual gunnery training. While there is an expectation on the part of a number of projects (LAVUP and CCV in particular) to rely on LV CTS for gunnery training, this capability will not be confirmed until the project completes its initial definition in 2012.

Live-Fire Monitoring System (LFMS)

Krauss-Maffei Wegmann (KMW) conducted a demonstration as part of the 2011 IG Conference at CFB Gagetown. It was an impressive showcase of what digital, high-definition, and wireless technology can bring to the Army. A live-fire monitoring system allows an instructor or commander to remotely monitor the actions of a vehicle crew during the entire engagement procedure. The system is mounted on the vehicle and links into the fire control system so that it can transmit through-sight video and weapon system status to a monitoring station behind the firing platform. The supervisor is able to see what the gunner and crew commander can see as well as interact with the crew via radio. Each shoot can be recorded and all data stored for the AAR process where an instructor can pinpoint the exact moment where a crew verged from a successful engagement. The system is a must have for the Leopard 2 as the instructor can no longer conduct "back deck" supervision due to the tremendous over pressure from the 120mm main armament. More than just a tool to support Leopard 2, the system has obvious merits in support of all live, direct fire training. While LFMS will not reduce the amount of live fire required, it will maximize the utility and training benefit of each round fired. Now the high level of supervision that is expected during simulation is also present of the live-fire range where confirmation must take place. Further, LFMS forces a range to slow down, concentrate on each student and each engagement, and provide an in-depth AAR process due to the wealth of information available to the crew and IG. The end result would be prolonged gun camps (a training issue all on its own) but it would also produce better trained and more confident gunners for the same amount of ammunition.

LFMS (Photo by Mr Matias, KMW)

Sub-Calibre Training Devices (SCTD)

A Sub-Calibre Training device or SCTD allows users to save ammunition costs and wear-and-tear by using a smaller weapon that shares similar ballistic characteristics. SCTD is integrated into the existing fire control system allowing the crew to complete most gunnery functions. The smaller calibre rounds share the ballistics of their large brethren up to a limited range thus allowing the gunner and commander to observe the fall of shot and make corrections. Ultimately, this allows the crew to fire more rounds at a fraction of the costs of full calibre ammunition. The Tank Replacement Project (TRP) will procure a SCTD for use with the Leopard 2 which will reduce the requirement for 120mm training ammunition while enabling crews to conduct more engagements. The SCTD will enable crews to perfect more complex engagements prior to confirmation with full calibre ammunition. The SCTD has significant limitations in that it does not properly train the loader, it does not replicate the consequences of fire, nor can it simulate all natures of ammunition at all ranges. Medium calibre platforms such as the Bushmaster Chaingun can also make use of sub-calibre technology. American Apex Corporation is trialing the GTS (Gunnery Training Solutions). It easily integrates into the LAV 25 and consists of two firing solenoids, one being a .50 cal and the other 7.62mm. Although there are initial costs in procuring the system, a SCTD could play a pivotal role in training the next generation of gunners in the Canadian Army.

SCTD components (Photos by KMW)

WES PGS (Weapon Effect Simulation Precision Gunnery System)

The WES PGS system is laser tag on a grand scale. When mounted on a vehicle, the system replicates firing a laser just like WES but can be precise enough to accurately reflect gunnery. This system can be used in conjunction with WES-activated pop-up targets such that you can conduct a range or battle run without firing a shot. Gunnery training would not be limited to the firing point and the complexity of austere ranges (templating, arcs, and safety issues) would be minimal. Further, a gunner could still gain value and practice his skills, going through all his functions during a collective training exercise. There are still major hurdles within this project to make it an adequate gunnery training tool. For instance, the system only informs the crew if a target has been hit or not as the fall of shot is not observed; the gunner is unable to apply corrections. From a gunnery perspective, the WES PGS system still has a long way to to become an effective gunnery training tool.

The challenges of ammunition rationalization are real as are the increasing demand for gunnery training in the next few years. Equally, the solutions offered by current technology are also real and achievable. These must be explored in order maximize success for each course and each gunner. With clear cut strategies, the right technology, and the expertise at the unit level, the Army will continue to train effective gunners and crews.

Editor's Note: The Army IGTM continues to explore viable options to support and improve gunnery training, the examples above being some of many being reviewed. Gunnery simulation will be a key topic addressed during the 2012 Army IG Conference.

Mental Resiliency: Keeping the Mind Fit

By Capt C.W. Meikle

Capt Cameron Meikle currently employed as the Technical Tp Ldr at the Armour School.

For a soldier to perform at their best in operations they need to be both experts in the skills of being a soldier and be physically fit. The mastery of both of these skill sets are undeniably important for a soldier to perform their duties, however a study of past conflicts reveal that people performed differently when faced with stress despite fulfilling both of these soldiering criteria.

This demonstrated that there must be another criteria to maximize performance when faced with extreme stress. Therefore, for the Army to improve its efficiency in battle it needs to identify what exactly this criteria is and teach it to all of its members. Many experts over the past century studied this field coining terms such as Shell Shock, Battle Exhaustion, and Operational Stress Injuries and made recommendations on what actions should be implemented to reduce the effects on soldiers.

Over the past ten years the knowledge behind Operational Stress Injuries (OSIs) has greatly improved and the medical world now has a better understanding on how the brain is affected by traumatic experiences. They have also identified that mental resilience has been shown to improve a soldier's overall performance during stressful situations as well as provide them with better overall health. As such, the Canadian Army is beginning to implement mental resilience training into courses at all levels of career progression and during high readiness training in an attempt to improve soldier's performance under stress and limit the effects of OSIs.

A conference was held on 12-13 October 2011 at the University of New Brunswick, "The Mind at War: Understanding, Preparing for, and Treating Combat Stress", to bring together CF personnel, academics and government officials to discuss both why and how mental resilience training will be integrated in all Army training. The following is a synopsis of the information discussed during the conference.

History

World War One was the first time studies were completed to analyze the effects of stress between Regular Army soldiers and civilian soldiers that were trained solely for the war. It was shown that the "Civilian Soldiers" were more prone to breakdown than "Professional Soldiers." Further still, elite military forces were even more resilient to breakdowns due to stress when compared to regular forces. This demonstrated that typical Army training improved a soldier's mental resiliency and that each individual has their own degree of resiliency towards stress. There were many different opinions from WW1 doctors on the cause of Shell Shock and what made certain people more resilient, however many steps were implemented prior to WW2 with the thought that the medical world could prevent Shell Shock from occurring. Time has shown that this was not the case, as similar symptoms arose from participants throughout and post WW2.

The Special Forces community from various countries were also very interested in this subject as they were experiencing very high drop out rates during their extremely stressful training courses. They started to implement mental resilience training at the start of their courses utilizing sports physiologists who help train high level athletes to perform their best in competition. The result was a dramatic increase in student performance when faced with the stress of course resulting in significantly higher student success ratios.

Current Theory

The strength of the Army is the capability of its soldiers, and fostering mental agility is key to a soldier's flexibility and ability to perform under stress. Utilizing the information available from history, the results of the Special Forces resilience training and the latest medical research into OSIs, the Army has developed its mental resilience training program. The idea is to implement this material into basic training, pre- and post-deployment training, and in all career courses to pass on this skill set to all soldiers. The main premise that the mental resilience training is centered around is soldiers applying a skill set called "The Big Four" in daily life, and especially when faced with stressful situations to reduce the effects of extreme stress: Goal Setting, Mental Rehearsal, Self Talk, and Effective Breathing.

> **Goal Setting** A simple concept however applied in a specific way to ensure that a soldier maintains their motivation and remains focussed on their task at hand. The philosopher Friedrich Nietzsche wrote "he who has a reason why, can bear with almost any how." The goals set under this ideal are used to remind a soldier what and why he has to do

his job. If a soldier sets a goal that he must scan his arcs for the next 8 hours in order to provide fire support for a team clearing his route for improvised explosive devices, when fatigue, hunger, fear, and a multitude of other stressors are placed upon him, he will be less likely to submit to these stresses and continue to do his job to the maximum of his abilities.

Mental Rehearsal This is the process of visualizing the tasks that you may be expected to perform under stressful situations. This increases your familiarity of the specific task, so that when you have to perform them under a stressful situation you will have more confidence in your ability to conduct them properly, improving your chances of doing it correctly. An example of the success of this idea was a parachutist who was jumping out of an airplane for the 250th time. When he jumped his primary chute failed to operate correctly and he was forced to cut it. Despite the stress of free falling towards the ground the parachutist cut the chute and deployed the reserve, landing safely. When asked how was he able to remain calm enough to perform his drill correctly he responded that he had already performed that task 249 times before (in his head) so it was nothing new to him.

Self Talk Everyone talks to themselves, though mostly in their heads, and the idea behind this tool is to replace the negative talk in your head with positives. In simpler terms, if you have ever been golfing and have to hit the ball over a lake often people will think to themselves over and over again "don't hit the ball into the lake" and almost without fail the ball goes directly into the lake. Self talk changes the negative thoughts into positives, so the golfer would think "I am going to hit the ball over the lake", and this positive outlook will improve their confidence and the likelihood that they will succeed. A more relevant example is that soldiers should not be thinking that they are "anxious about fighting" but should be thinking that they are "anxious to fight".

Effective Breathing This technique has already been implemented in the "Gun Fighter" shooting program and is a reminder that when situations become stressful you need to force yourself to breathe to ensure the correct circulation is occurring and calming yourself down to bring you back to an effective functioning level.

Conclusion

With the implementation of the "Big Four" into training, the Canadian Army will be joining other western armies on the leading edge of mental resilience training. The UK Armed Forces, originally started with the Royal Marines, has been conducting its version of mental resilience training called TRiM (Trauma Risk Management) since 2004 with good success. The "Big Four" needs to be implemented as a lifestyle change to CF members and needs to be continually maintained. Just like physical fitness, individual soldiers are responsible to up keep their mental resilience, but by using "The Big Four" tools throughout a soldier's career, and especially in stressful situations, soldiers will be able to perform during the most stressful of situations and maintain better overall heath.

Editor's Note: The Army continues to make improvements in terms of our understanding, treatment and prevention of OSIs. Simple drills and techniques, like the ones mentioned above, can greatly reduce stress and enable better results. As mentioned above, the best results are achieved when instituted into our training program, such as the Personal Weapons Test Level 4 (aka Gunfighter) and Tactical Combat Casualty Care (TCCC) Course. The Mental Resiliency packages that are being included in leadership courses are another example of putting the theory above into practical application by leaders on the ground. Finally, for those interested in further reading on this topic, the seminal works are LCol Grossman's (ret'd) On Killing and On Combat.

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