



CANADIAN ARMY

TODAY

SPRING 2023 | VOLUME 7 | ISSUE 1

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- Integrating Combat Enablers
- Dispersed and Connected Command
- Better Industry Engagement
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- Defining LUV
- Planning Civil Assistance
- Reconstituting the Force

Building to a Brigade
Growing the Battle Group in Latvia



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Photo: S1 Camden Scott

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EDITOR'S NOTE



Last fall, I spoke with a team from Defence R&D Canada and the Canadian Army Land Warfare Centre about a survey they were preparing to conduct with members of the Directorate of Land Requirements (DLR), the training schools at the Combat Training Centre, and others across the Army.

In a nutshell, they wanted these procurement and force development experts to help identify the capability gaps most likely to confront the Army over the coming decade.

Some, of course, are already well known — ground-based air defence (GBAD), for instance. So, what they hope to learn are some of the possible linkages — say, GBAD but with high energy lasers — and the potential structural changes, personnel and training requirements that could underpin new equipment.

That discussion was front of mind when I spoke with the commander of Task Force Latvia and the commanding officer of the enhanced Forward Presence Battle Group Latvia about the implications for both as the Army commits to supporting the expansion of that battle group to brigade-level strength. What are the capability gaps that need to be filled, either by Canada or NATO partners, to make that happen?

The government has recently announced three urgent operational requirements (UORs) for Latvia — portable anti-tank missile systems, short-range air defence, and counter uncrewed aerial systems — all of which are now being fast-tracked through the procurement system. But there may be more. The discussion about which countries will contribute to the brigade and what they will send is still underway.

Then there is the equipment from the Army's inventory that has been shipped to Ukraine. As the magazine went to press, the government announced the donation of approximately 8,000 more rounds of 155mm ammunition, on top of the 27,000 rounds already delivered, as well as 12 air defence missiles and more than 1,800 rounds of 105mm tank training ammunition. Though donations of Leopard main battle tanks, armoured combat support vehicles, M777 howitzers, Carl Gustaf M2 recoilless rifles, and M72A5-C1 rocket launchers do not constitute capability gaps, they are nonetheless vital equipment that will need to be replaced, and possibly before the battle group can be scaled to a brigade.

DLR is already bracing for a busy period over the next five years as many of its projects reach the final stages. But the lessons from Ukraine, the donations that will need to be restored — and not necessarily with like for like — and the demands of the augmented brigade suggest a major investment in procurement capacity at a time when the Army is stretched thin. ■

Chris Thatcher, Editor

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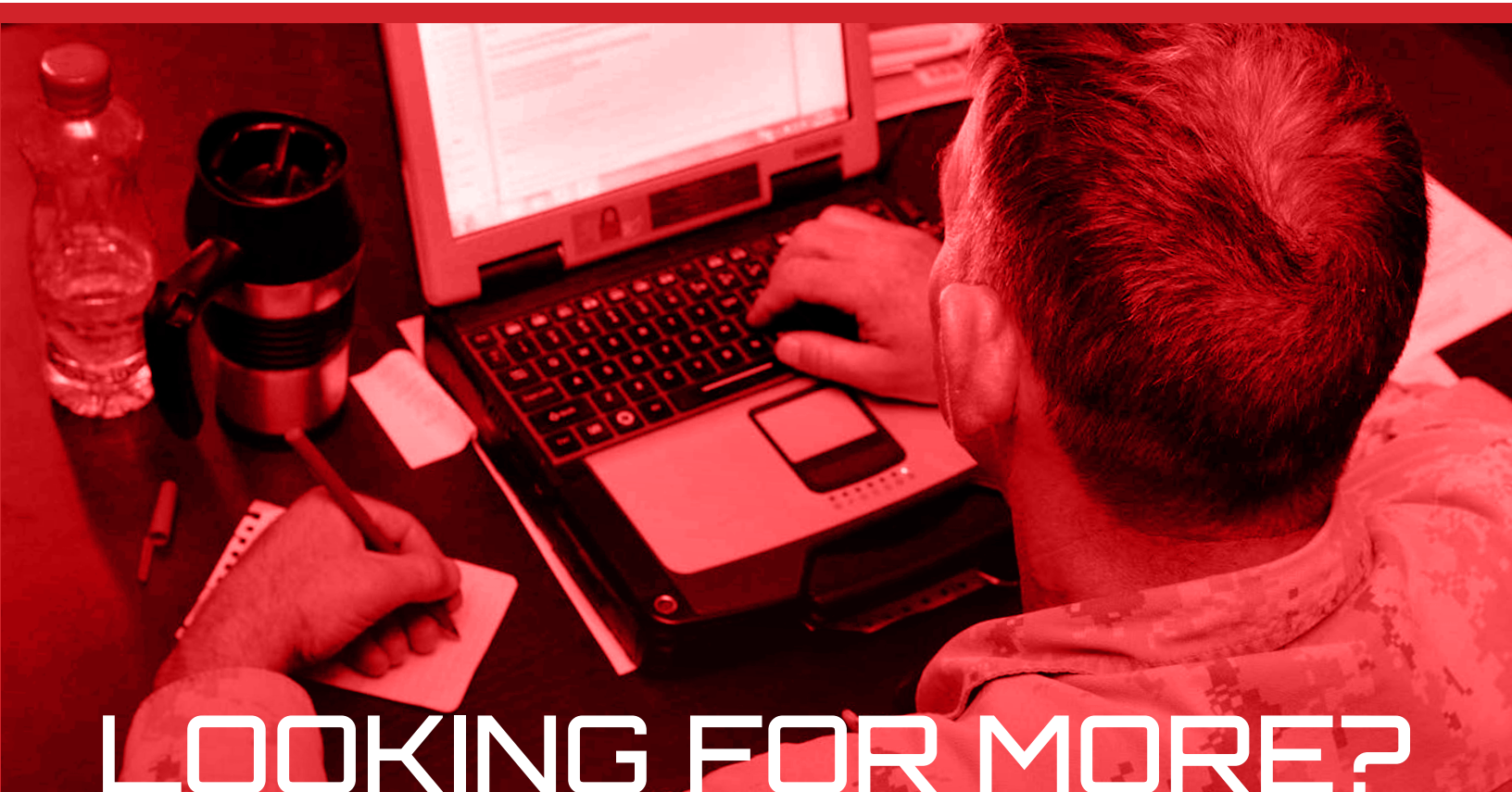
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NEW RHIBS AFLOAT FOR ARMY COMBAT DIVERS

By Ken Pole

Some years ago, during his 32-year Army career, when he was a Colonel, John Errington, who retired last summer as a Brigadier-General and Commandant of the Canadian Forces College in Toronto, observed about Army divers:

“Dive operations are a vital capability in the Canadian Army as well as among Canada’s allies ... throughout the spectrum of conflict from peacekeeping to combat operations. They require physical robustness and mental agility, so it is not surprising that they are among the best soldiers in any force.”

It was high praise from the storied “been there done that” officer.

Diving in the Canadian Army began in the 1960s with the arrival

of amphibious vehicles, the latest of which is the Bandvagn 206, manufactured by Hägglunds of Sweden. While the BV206, which entered service in 1980, has an excellent operational record, some predecessors needed emergency diver support.

Diving sections were established in Army engineer units in 1969. Those evolved into combat diving with combat engineering. The divers’ missions began to include obstacle construction and breaching, mine warfare and underwater construction. Now an Occupation Sub-Specialization within the Army’s four regiments of combat engineers, divers work mainly inland, either on the surface or beneath it in close support of ground operations. They

are also used for reconnaissance and may sometimes work in salt water, usually the realm of Royal Canadian Navy clearance divers.

It was such a mission that kick-started a project to replace the Army’s conventional inflatable boats. In September 1998, Army divers were involved in the recovery of debris from SwissAir Flight 111, which crashed into the Atlantic eight kilometres off Nova Scotia shortly after a late-night takeoff from New York to Geneva. All 229 crew and passengers died, and the impact left a huge field for the divers to search. That grim task was complicated by the realization that the Army’s inflatables were simply unsuited to conditions offshore.

The Army filed a “deficiency”

report, but it took a while for all the parties involved to come to an agreement on how to proceed. A first Public Services and Procurement Canada (PSPC) call for bids in May 2016 was revised less than two months later and then cancelled “following questions from industry regarding the performance specifications.”

A new tender issued that November resulted in four bids. In January 2017, PSPC awarded a \$6.4-million contract to Zodiac Hurricane Technologies of Delta, British Columbia. But that, too, was cancelled due to “an irregularity regarding the conduct of the bid evaluation.”

The Department of National Defence said there was no



Combat divers from the 35th Combat Engineer Regiment practice moving a buried vehicle underwater at CFB Valcartier in August 2022. Photo: Cpl Sébastien Lauzier-Labarre

operational impact, but the clock was clearly ticking on an aging fleet of inflatables. And the replacement project is as yet unfunded.

The Army is now in the process of preparing a funding request for submission, said Master Warrant Officer Daniel Roberge of the Directorate of Land Requirements.

To maintain the current fleet, the Army is leaning on a PSPC \$16.5-million contract awarded to Zodiac Hurricane Technologies for “as required” inspection, repair, and overhaul of more than 1,000 all-fabric inflatables, as well as more than 250 rigid-hulled inflatable boat (RHIBs) used by others, including the Navy.

That contract is set to expire at the end of this year but there is an option to renew for a further three years to “ensure the CAF’s fleet of inflatable

boats remains capable of meeting current and future operational demands for missions such as search and rescue, dive support, fishery patrols, boarding party operations, and the transfer of personnel and equipment.”

What, then, is the Army looking for?

“Inflatables are fragile, especially for beaching” when their fabric hulls are often run onto land at fairly high speed to get troops quickly into action at reduced risk. “The boats we have right now are always going for repair,” said Roberge, pointing out that most are at least 10 years old, an eternity in the rubber boat world. “There’s more patch than rubber on some of them.”

The logical replacement would be an all-RHIB fleet with composite or aluminum hulls. The current focus is a boat approximately nine metres in length, with a 2.5-3m beam easily

transportable by trailer. It must also be suitable for deployment from ships and by Air Force aircraft such as the CH-147F Chinook helicopter, CC-130J Hercules and CC-117 Globemaster III.

The tandem-rotor Chinook’s cabin is 9.14 metres long, 2.53m wide and 1.98m high. The Hercules measures 12.5m by 2.74m by 2.05m and the Globemaster is a cavernous 25.82m by 5.48m by 3.76m. A pair of nine-metre RHIBs would present no challenge for the latter, but their outer tubes would need to be deflated to fit in the other two.

As for powering RHIBs to a cruising speed of 30 knots or even faster when required and when the weather permits, there are several options: internal diesel engines, monster outboards — which can be swapped out quickly for maintenance — or, given the way battery technologies

are evolving, electric drives.

“Right now, we’re looking at having seating for 10 divers,” Roberge said, and capacity to securely carry heavy conventional dive tanks, which are generally mounted in pairs, or other lighter but often bulkier breathing gear, as well as weapons and other equipment.

The numbers required also remain to be determined. Right now, two would be set aside for training and one boat would be assigned to each of the combat engineer regiments in Edmonton, Petawawa, Valcartier and Gagetown.

The project still requires budget approval, putting it on track to deliver new boats within the next three to four years, Roberge acknowledged. “But we’re in the process of preparing to submit that, hopefully before the spring.” ■

A NOVEL SOLUTION TO A SHAKY C-6

By Ken Pole

Even when fully inflated to maintain shape — and perhaps especially so because of inherent vibrations — inflatable boats are not an ideal mount for infantry tasked with getting onto a beach quickly while maintaining suppressing fire at up to 1,100 rounds per minute with the Colt Canada C-6 general purpose machine gun (CPMG).

It’s not the fault of the weapon or the operator, even at lower rates of fire and in flat water. Add wave action to the mix and fundamental physics of the CPMG’s recoil on a flexible platform and you have a challenge the Army has literally been wrestling with for some time.

The gunner usually makes do with a pile of rucksacks at the bow, settling into position with the left hand crossing the body to the top of the butt to snug the weapon into position for firing with the right hand. “Even then, it’s very bouncy and hard to keep control,” agreed Master Warrant Officer Daniel Roberge of the Directorate of Land Requirements

(DLR).

The need for a solution was originally identified by 2 Combat Engineer Regiment at Canadian Forces Base Petawawa. National Defence allowed that firing from a pile of rucksacks or even nothing, “did not make for the most stable platform to fire from” and asked DLR to come up with a solution to what has been a potentially deadly tactical deficiency.

“They have come up with a prototype that you strap to the bow of the boat to mount a C-6,” explained Roberge, a master gunner who is enthusiastic about anything that can give troops an advantage. “It just doesn’t move!

The prototype is similar in concept to the door gunner’s pintle on Royal Canadian Air Force’s CH-146 Griffon multirole helicopters, but the base evokes the solidity of a medieval knight’s breastplate.

And once the inflatable grinds onto a beach or riverbank, packed with troops and the gear, the C-6 is quickly dismountable for use on



land. “We have had good feedback,” Roberge said.

The basic concept was field-tested and effectively validated last fall, albeit with some fine-tuning of how it is strapped down to connectors glued to the inflatable. More refinement is planned before the design is approved for production,

either in-house or through bids from the private sector. “Keeping it inside would put additional demands on our internal resources,” he pointed out.

At present, it’s an Army solution to an Army problem, but if allies see the mount on exercises or as a product promoted by industry, it could find a much wider group of users. ■

AFTER PANDEMIC, RANGERS UNITE ON EX MOBILE RANGER

By Ian Coutts

For the members of the 3rd Canadian Ranger Patrol Group (3 CRPG), the return this year of Exercise Mobile Ranger was a welcome chance to refresh their skills, reforge old connections, and reach out to new partners.

Held over February 21-28, Mobile Ranger is supposed to be an annual exercise, but this was the first time since 2019 that the Canadian Rangers have been able to carry it out. The 2020 version was cancelled due to Covid-19 and, in the years since then, 3 CRPG members have been kept operationally busy helping their remote home communities of Northern Ontario cope with the effects of the pandemic.

Now, finally, there was a chance to step back from what had been a busy operational tempo and do some work on fundamentals.

Canadians in the south might puzzle about such exercises in the depths of winter, but the cold weather makes it easier to move about a region where there are few roads and travel by truck and snow machine is faster over frozen lakes and rivers. And working in extreme cold is one of the Ranger's specialties.

The Canadian Rangers' tasks during the exercise included establishing winter camps, navigating overland and along ice roads in austere conditions, and practicing wilderness first-aid and ice rescue techniques, explained Captain Camilo Oleo-Ortega, 3 CRPG's public affairs representative.

Members of A company gathered at two locations, the Harricana River, east of the region covered by the Moose Factory Canadian Ranger Patrol, and north of the Nibinamil Canadian Ranger Patrol region at a place known as the Breathing Grounds.

Members of B company met in the vicinity of Kitchenuhmaykoosib Inninuwug First Nation, not far, by

northern standards from the Manitoba border. The exercise involved 54 Rangers from 3 CRPG, five from 2 CRPG in Quebec, 18 support staff and 19 "green" soldiers, Regular and Reserve members, from 4th Canadian Division. These deserving soldiers, in the words of Major John McNeil, the officer commanding 3 CRPG's A company, were given the opportunity to train with the Rangers to "pick up various survival skills."

For Canadian Ranger Gilbert Spence, from Atawpaistat, joining the exercise meant a 110-kilometre trip by truck on the ice road from Moose Factory First Nation, and then a three-hour snowmobile ride over the frozen James Bay to the exercise location, where he was delighted to find that their accommodation would be a wilderness lodge on the Harricana River. In non-Ranger life, Spence is a foreman at the Attawapiskat airport, and he welcomed the chance, as he put it, "to get out on the land."

As well as the more formal training during the week-long exercise, Spence and his fellow Rangers had a chance to compete in a Ranger Challenge, where they worked in teams to show their skills at cold water rescue, freeing a trapped snow machine using block and tackle, and at shooting and ice fishing.

Participants in B company's portion of Mobile Ranger undertook a survival challenge. They were dropped off in groups of four on islands in frozen Big Trout Lake with orders to "make a shelter using an emergency reflecting blanket, pine boughs and snow," explained Master Bombardier Nick Speer-Lapointe, a Reservist from Sault Ste Marie, and then spend the night in it.

In addition to uniting 3 CRPG's scattered patrols for the first time in a few years, Ex Mobile Ranger gave them a chance to meet with colleagues they don't normally see. "My company had the opportunity to train with Rangers from Quebec,"



Firing from the cover of a snowmobile. Photo: 3 CRPG



Winching a snow machine from a gully. Photo: 3 CRPG

said McNeil. Working together at a location at the mouth of the Harricana River on James Bay, they constructed a bush airstrip. It was, he explained, a chance to learn how the Quebec Rangers did things and to exchange "best practices. They came to us this year and maybe in the future we'll go to them."

While working with the Rangers is a learning opportunity for members of the Army, Rangers gain almost as much. "For the younger Rangers, it's a thrilling opportunity" to see what it is that the Army does," said McNeil. "Even the older ones feel honoured to pass on their skills."

Corporal Roland Leaman, a member of the 3rd Battalion, The

Royal Canadian Regiment, jumped at the chance to join the exercise, an opportunity that took him from Petawawa to Borden, to Timmins, to Smooth Rock Falls, and then north along the ice road. "It was something completely out of my wheelhouse," he said of his time with the Canadian Rangers. "They are dedicated people. They know the land."

As a northerner himself (though not that far north), Speer-Lapointe said Army members "know they exist," but exactly what they do was new to him and educational. Offered the chance to work with them again, "I would absolutely go back up," he said. ■

NEW SLEEPING SYSTEM COVERS ALL BASES

By Steven Fouchard

They may not be the first thing that comes to mind when we think about a modern military force, but sleeping bags are vital equipment, and the Army is introducing a new type that will keep soldiers warm and healthy in all kinds of weather.

The General Purpose Sleeping Bag System (GPSBS) is replacing its Cold War era predecessor, known as the Sleeping System Outfit, Extreme Cold Weather (SSOECW).

"The SSOECW is a down and feather bag," explained Alexandre Legault, a member of the GPSBS project team. "It actually had some really good, interesting design characteristics but we really needed to modernize."

As the old system's name suggests, it was more than capable for the cold. The GPSBS is suited to a much wider range of conditions.

While the GPSBS is already quite versatile, further enhancements are being explored, including an add-on component for extreme

cold. "It's about making sure we have everything the soldier needs to be able to perform in Iraq in the summer all the way to the high Arctic in the winter," he said.

The lightweight GPSBS, which includes synthetic insulation in place of down, covers all those bases with a design that essentially offers the user three configurations in one package.

"You have the outer insulating bag, which is a warmer weather bag," Legault explained. "It's for really hot, humid climates. It'll keep you warm when the temperature starts to dip later at night because the GPSBS synthetic insulation retains more warmth than down when wet, and also dries faster."

"The inner bag is a little beefier," he added. "It's more suitable for below zero. We've all seen that winter weather where you still have slush on the ground even though it's below freezing. It's able to handle getting some of that moisture in it. And then you can use the two

together for the coldest conditions."

A high level of moisture resistance is important for those times when soldiers must move quickly.

"Something might happen," said Warrant Officer Duane Gyuricska, another member of the GPSBS project team, "and you have to pack up quick. Everything just gets stuffed into a bag and away you go. There isn't always going to be time to air out and clean your kit. This bag will bounce back better from that."

That said, project team member Captain Jun Bae added that it's important to maintain the bags when not in the field. "When we come back, we should be taking the bag out, making sure it's dry and in good condition before we put it back in the sack," he said. "This equipment is good for us. It's modernized, it works. But only if you take care of it."

Improvements were made to the GPSBS version now being fielded in response to early user feedback.

"We were able to interrupt some things that weren't as functional as we would have liked and improve on them," said Legault. "We're going to take a bigger round of feedback this year. We did a bit of an alpha release and now we have more people using it to support that process; we're doing a bigger rollout and taking their feedback." ■



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INNOVATIVE CANADIAN TECH FUELS UKRAINE'S RESISTANCE

By Treena Hein

At this moment, made-in-Canada rechargeable 'Batt Packs' are being used by soldiers in Ukraine — and the company that makes them is hoping these innovative units will become a standard piece of field equipment for humanitarian efforts and armed forces in many countries, including Canada.

The lightweight, silent and fume-free 'Batt Pack,' made by Hybrid Power Solutions (HPS) of southern Ontario, fills a need for a substantial amount of portable power generation. At 40 kg with no heat signature and functional down to -30°C, they can be charged in three different ways to power countless applications.

"We've been told they went to the front lines in Ukraine, so they might be powering light and heat in camps and trenches, but also to recharge drones or rescue people trapped in buildings after an artillery strike," said Francois Byrne, founder and chief operating officer. "They can easily power a heavy-duty tool to get into or out of a building, like a jackhammer, coring drill or concrete saw. And because they provide high-quality electricity with a pure sine wave, they can power items like laptops [and] sensitive communications equipment."

To make sure the batteries could be put to immediate use in Ukraine, Byrne and his team did two things before shipping 22 units overseas just after New Year's Day. They made the connections simple and fast, and made the instructions graphics-based to avoid language barriers.

Batt Packs are rugged, weatherproof, and with an automated heating unit that activates in extreme cold. Yes, that draws power, says Byrne, but it prevents the loss of 20 to 30 percent in Batt Pack performance when temperatures dip down.

The 4000W-3.6kWh Batt Packs now in Ukraine can be charged with

their portable solar arrays (six to eight hours) or from the grid (about five hours). But the Canadian Armed Forces also requested vehicle charging.

"We quickly customized it so that you can put one on a vehicle roof and simply run jumper cables to it from the vehicle battery," Byrne said. "Charge time using that method is five to six hours." In addition, combining up to three charge sources — for example, attaching the solar array during vehicle charging — cuts charge time significantly.

A new 5000W-5kWh version has a much faster charge time due to its larger solar array and higher energy capacity battery. These units are also 20 percent smaller and lighter due to eliminating wasted interior space and new battery technology.

Byrne started HPS in 2015 and he now has 24 employees. Before this Ukraine contract, the firm did have some military involvement, supplying the battery system for Rheinmetall Canada's Mission Master uncrewed ground vehicle project. He's also had discussions with a combat vehicle manufacturer, but the construction and mining sectors have been the company's main focus.

Byrne has always viewed the military as a potential customer — he knew he had a product armed forces needed — but was intimidated and unsure how to break in. He looked at how to pitch a solution through the Innovation for Defence Excellence and Security (IDEaS) program, for "reliable, energy efficient, integrated and scalable energy systems" for temporary camps. But it took until January 2020 to get a presentation slot under the Tactical Power Systems program.

"It's a procurement project for replacement of all generators with new technology," Byrne explained. "I gave it our best shot, but as the months went on, we lost some hope. Then in December 2022, we got a call about getting our Batt Packs to

the Ukrainian Armed Forces as soon as possible."

The urgency to ship, combined with the units needing to be modified for European voltage, meant HPS team members worked every day, through Christmas and New Years, scrambling to source and integrate European parts. By the first week of January, 22 units shipped out, and they were even camo green.

"That's all we could ship due to the parts we could get, but we're

going to be shipping more 5000W units as fast as we can," he said. "We're hoping to ship hundreds this year."

"This is a proud moment for us," he added. "It's great to help with off-grid dream homes and mining and construction, but this order means we are helping in Ukraine. Of course, we don't know where exactly our units are and what they are being used for, but we hope they are having a big impact." ■



WIDER ARCS, MORE TARGETS ON AGLS RANGE



A member of A Company, 1 PPCLI firing the C-16. Photo: Cpl Jay Ekin

Last fall, Canadian Forces Base Shilo opened a new firing range for training on the Army's automatic grenade launching system (AGLS), the C-16 Close Area Suppression

Weapon (CASW), and anti-tank weapons.

Shilo's primary range was first opened in the 1950s. But as the firing distance of weapons has increased, keeping ordnance within the boundaries of the training area became difficult.

"On the former range, we had to reduce the arcs so much that soldiers could only engage one target," explained Rob Shearer, acting ranges and training areas manager.

Previously, "we couldn't allow for the new ammunition for the AGLS firing live," he said, noting the system can produce duds, which can then prevent manoeuvre through that area. "We had to fence off the area before we could open up the range. The

[new] area is allocated specifically for rockets and the high explosive dual-purpose rounds of the AGLS system."

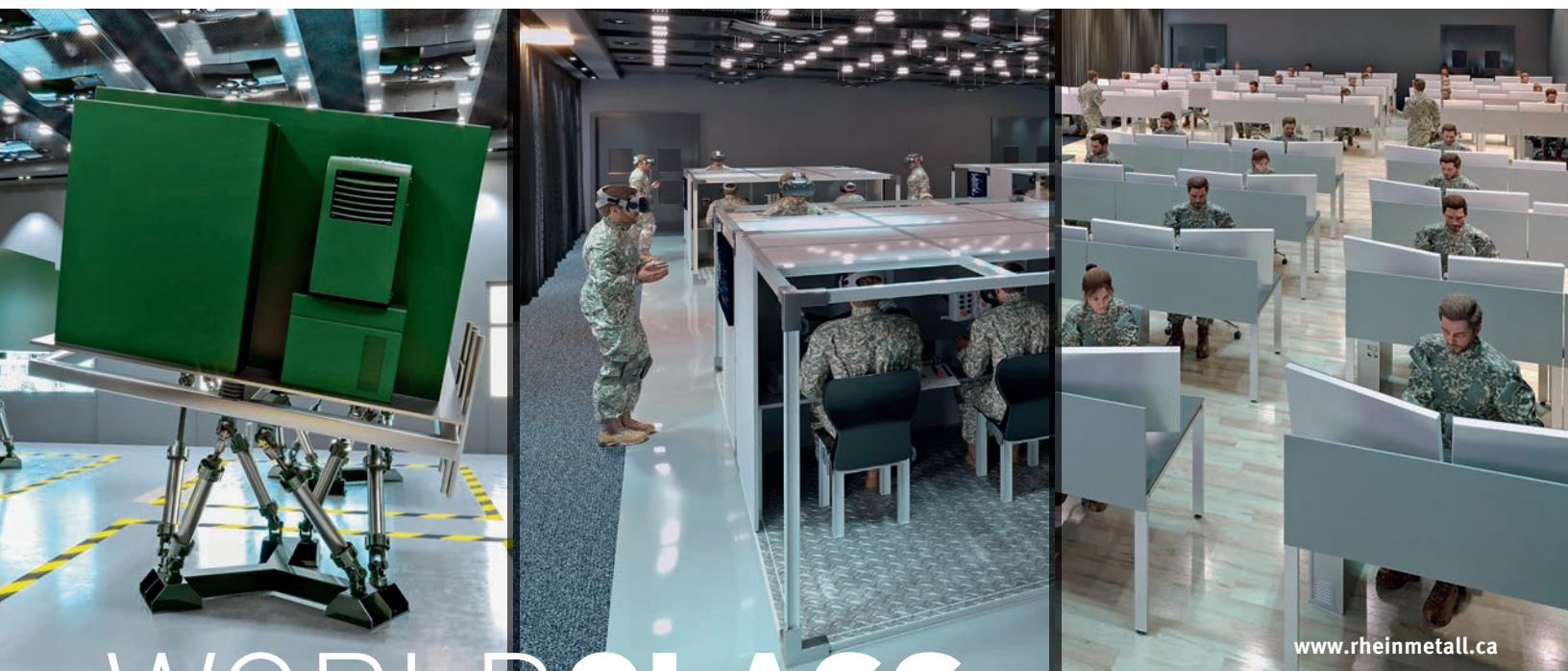
The new combined AGLS and anti-tank range, about 10-square kilometres located inside the manoeuvre area, will support training for an array of C-16 ammunition and medium (MAW) and light anti-armour weapon (LAW/M72 66 mm rocket launcher) ammunition.

Though nothing high-tech such as digital scoring or mobile targets — the firing area is a gravel pad with some concrete positions for rockets, Shearer said — the new range offers more targets, with greater arcs and at a greater distance (100 metres to 1,500 metres) from the firing position.

The range area must still be fenced off due to the dangers of unexploded ordnance from MAW, LAW and C-16s. But by combining two weapons systems on the one range, Shilo has limited the amount of land that would be restricted from manoeuvre, Shearer noted.

The range officially received its license to open in October, and has seen only modest use since then as the primary users, the 2nd Battalion, Princess Patricia's Canadian Light Infantry, and 1st Regiment, Royal Canadian Horse Artillery, have been deployed on Operation Reassurance.

"It has been a long time coming," said Shearer, who credited his recently retired boss for steering the project to completion. ■



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Members on a live fire exercise as part of Exercise Wolverine Shield/Strike in Latvia in March 2023. Photo: CAF



BRIGADE STRENGTH

Scaling the battle group in Latvia to the strength of a brigade will require a deft touch and a great deal of negotiation to source the necessary capabilities

By Chris Thatcher



Army Commander, LGen Jocelyn Paul, and the Army Sergeant Major, CWO James Smith, receive a brief from the battle group headquarters in Latvia. Photo: CAF

There's a fine art to force generating a multinational battle group. Partner nations are often occupied with their own national priorities and grappling with the limitations of their defence budgets, so building combat capability requires some armour from one, artillery from another, and engineers and a few enablers from a third.

Consequently, scaling that force to a full-strength brigade is no small task.

Last June, Canada confirmed a commitment to continue its role as a framework nation for NATO's enhanced Forward Presence (eFP) Battle Group in Latvia. It also agreed to work with allies to generate and stage the necessary forces to surge that formation to a combat capable brigade, leading a headquarters element and contributing capabilities like air defence systems and anti-tank weapons.

The full extent of what the Canadian Army might contribute is still being defined. The Canadian government and Armed Forces must initially get partner nations onboard, and then earmark funding and determine Army capacity as it reconstitutes the force.

But the job of sussing out the specifics of what partner nations might be able to send and then force-generating that larger formation over the longer term falls to Task Force Latvia Headquarters.

Since NATO stood up the four multinational battalion-sized battle groups in Estonia, Latvia, Lithuania and Poland in 2017, Task Force Latvia has worked with the host Latvian mechanized infantry brigade and the sending partners,

which now include Albania, the Czech Republic, Iceland, Italy, Montenegro, North Macedonia, Poland, Slovakia, Slovenia and Spain, to generate a deterrence force to any Russian aggression.

"We build the battle group, and we hand that over to NATO once it is formed," explained Colonel Vince Kirstein, the task force commander. "My headquarters makes sure all the pieces are there and we deal with Latvia to make sure we have all the infrastructure, all the support that we need from them as the host nation."

NATO sets minimum capability requirements for each battle group, but there is no universal standard or composition. While that might make the task of building a brigade a little easier — Kirstein will not have to follow the same formula or find the same combat units as the British in Estonia, the Germans in Lithuania, or the Americans in Poland — generating the necessary numbers could nonetheless be a challenge. After Russia invaded Ukraine last February, NATO members agreed to establish four more multinational battle groups in Bulgaria, Hungary, Romania and Slovakia.

"That has changed some of the calculus," Kirstein admitted. "Some of the contributing nations to our battle group are now framework nations or host nations for those eFP battle groups."

Furthermore, NATO has since decided to scale all eight battle groups to brigade strength.

"That is a whole lot of troops that are going to be required for all of that,"

the armoured officer with the Lord Strathcona's Horse (Royal Canadians) noted. "We are working with the sending nations we currently have, but we are also looking to other folks, particularly in this region, that may be interested in contributing. We anticipate there will be a bit more of a regional outlook by member states because now they are going to be moving a lot more pieces and it's easier to do closer to home."

"The eFP battle groups all fulfill the same function, but they all look slightly different, depending on which country has the lead and which countries are contributing," observed Lieutenant-Colonel Craig Higgins, commanding officer of the battle group in Latvia, currently comprised of a team mostly drawn from the 1st Battalion, Princess Patricia's Canadian Light Infantry (PPCLI). "My assumption would be that the brigades will take a similar approach. None will look exactly the same doctrinally, but they'll provide the same function."

The task force knows which countries have what capability, and is targeting its requests. But if specific capabilities prove difficult to find, Canada, as the framework nation, could be on the hook to fill any gaps, a fact acknowledged by Army Commander Lieutenant-General Jocelyn Paul in an interview last fall.

"We are still figuring out exactly what we are going to be able to do," said Kirstein, noting the role of contributing nations and federal government funding. But as the lead nation, "you can't just be the headquarters and not provide any of the troops."

"That debate is all happening in the background right now," he added. "But

looking at this from the perspective of the guy who has got to build it, we are really trying to make sure we have the right force mix given the terrain we are dealing with here. Latvia has different terrain than, say, Poland. The threat is different as well. All of that is being taken into account to ensure we have a combat capable force."

After 12 rotations, the battle group has well-established standard operating procedures and a solid sustainment plan, so scaling to a brigade will be more about expanding what is in theatre rather than creating new practices or capabilities, he said.

The battle group is fully embedded within the Latvian brigade, so the brigade's operational and logistics structure is at least partially in place, said Higgins, an infantry officer. Core functions like command and control, coordination of artillery, air defence, engineering capabilities and sustainment are already established.

"All those will continue to function in parallel while the multinational brigade gets stood up. At a certain point, those capabilities will be built up or mature enough that we would switch to being supported by a new structure," he said.

Over the next 18 months, the Army will aim to fill at least three capability gaps in its current inventory: portable anti-X missiles (PAXM), very short-range air defence (VSHORAD) and counter uncrewed aerial systems (CUAS). The three have been deemed urgent operational requirements that "would inherently be required in a brigade," Kirstein noted. CUAS would typically be a division level



Members on a live fire exercise as part of Exercise Wolverine Shield/Strike in Latvia in March 2023. Photo: CAF

asset, but could be plugged in to help a brigade defend itself.

The Canadian PAXM and VSHORAD systems would augment what is already provided by other members of the battle group, Higgins confirmed. But functions like air defence coordination, which does not currently exist but would be a necessary part of a brigade construct, “those would likely come in as the brigade is stood up and developed. It’s just a matter of when they come in, and what structures here they might be able to plug into until a brigade is fully fleshed out.”

Some systems like additional PAXM would be straightforward to integrate, “because they’re pretty much point and shoot technologies,” he added. But others might “require national level direction as they need places to house them, technicians to maintain them.”

It’s not yet clear whether the brigade would require Canadian tanks. At present, Poland, Spain and Italy have tank companies in the battle group, but Spain is slated to become a framework nation for one of the new battle groups.

“I would love to see Canadian tanks here,” said Kirstein, who deployed with the Leopard tank to Afghanistan in 2007 as part of the 3rd Battalion, Royal 22^e Régiment and served as commandant of the Royal Canadian Armoured Corps School from 2017 to 2019. “This is where we are going to need them if we need them.”

Beyond the challenge of “figuring out who is providing what” to a brigade, Task Force Latvia must also address issues with infrastructure and training

facilities. Currently, Latvia does not have the facilities to house and feed an entire brigade, maintain vehicles, or securely store large quantities of ammunition. The task force headquarters is working closely with the Latvian government and military on new building specifications and other details to “make sure that what they are doing aligns with what we need and can happen in the order we need it to,” Kirstein said.

Brigades require a lot of ammunition, so pre-positioning ammo in the requisite storage “is going to be key to the combat capability of this brigade,” he added.

So, too, is a larger training area. For units used to collective training on the vast ranges of Wainwright and Gagetown, the average range in the Baltics is about seven kilometres by 12 kilometres and is already a challenging space for a battle group.

“That is arguably the most critical piece,” said Kirstein. The Latvian military is looking to secure an additional base.

The battle group recently completed Wolverine Forge, an exercise of command and control at the company level, and Wolverine Strike/Shield, an exercise of the battle group’s sub-unit defensive and offensive operations, and was about to launch into Exercise Crystal Arrow 2023, a NATO combat readiness evaluation. Higgins acknowledged the challenges of the training areas and suggested that could be a limiting factor, initially, for the brigade until new infrastructure and training facilities are in place.



A member of the Royal Canadian Artillery on a live fire exercise as part of Exercise Wolverine Shield/Strike in Latvia in March 2023. Photo: CAF



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Conducting a wet gap crossing with assistance from Spanish engineers during Exercise Wolverine Forge in Latvia in February 2023. Photo: SSgt Christian Milano, Spanish Army

"This is one of those things where we want to balance our appetite," he said. "You could surge everything here and put it under tents, but can you sustain it? On paper it might look fairly easy for any nation to just take a brigade group and chunk it down here, but how do you keep that functioning in an efficient way, for the long term? It's that balance between getting more fighting power with what's behind that. That's where a lot of the discussion and analysis that I've seen has been going on."

Just how quickly the battle group needs to evolve to brigade strength will be predicated somewhat by Russian activity over the border. "This is all threat dependent," Kirstein acknowledged. "If we were to have the understanding that Russia had any indication of threatening Latvia, then we would already be moving pieces over here. But we're not there yet and it means we've got some time. How much remains to be seen."

Higgins, who also spent 13 years with Canadian Special Operations Forces before rejoining the Army in 2019, cautioned that while experts might argue Russia has depleted a lot of its force and remains preoccupied with Ukraine, "they have the ability to influence this area of operations with rockets and missiles, drones and aircraft, almost instantaneously, if they want to. We operate under the assumption that if we need to respond and fight tonight, we're able to do that."

For Ex Crystal Arrow, which will likely see the entire battle group deployed and tested in some capacity, the NATO validation of capability has not changed despite Russia's invasion of Ukraine. "While Russian actions have changed, the way [we] would operate tactically hasn't fundamentally

changed," said Higgins. "The way we run the current exercise is not vastly different than previously."

Kirstein served as the deputy commander of the Latvian Mechanized Infantry Brigade from 2019 to 2021 and has used that close relationship to remain in almost daily contact with the brigade commander and senior leadership. The evolution of the Canadian-led battle group to a brigade would change the command structure, but not the effectiveness of the two formations, he suggested.

"In the long run, we should end up with a command structure that makes more sense tactically, which isn't something we have had to worry about as part of the Latvian brigade — we went wherever the brigade went," he said. "Now, we have the opportunity to separate those two and divide Latvia so that the two brigades can fight separately, but very closely coordinated."

In February, LGen Paul visited NATO partners in Europe and the battle group. Though the tour included time with soldiers, it was also about understanding the conditions on the ground and drumming up support to augment the brigade.

"What we are trying to do is generate, from a Canadian perspective, something that is going to be sustainable," said Kirstein. "Regardless of how the fight in Ukraine progresses, there will still be requirements for commitments here, and it could be for a while. Canada is committed to Latvia and until the threat goes away, we will remain committed. So, for the Army commander, that means we have to have a construct we can support without breaking the Army or it is not a viable option." ■

CAPABILITIES NEEDED — URGENTLY!

By Staff

We're not quite into "For the want of a nail ... the kingdom was lost" territory, to paraphrase Benjamin Franklin. But for want of anti-tank weapons, air defence and counter-uncrewed aerial systems (UAS), defending troops, vehicles and headquarters in a future battle would be exceedingly difficult.

As the Army begins to scale the 10-nation enhanced Forward Presence (eFP) Battle Group in Latvia to the strength of a multinational brigade, it must fill at least three capability gaps to meet that NATO obligation — portable anti-tank missile systems, air defence and counter UAS.

"Canada does not have some of those capabilities that would inherently be required in a brigade," observed Colonel Vince Kirstein, commander of

Task Force Latvia, responsible for negotiating with contributing nations on the composition and eventual combat mix of the brigade. "Typically, air defence and anti-tank weapons are going to be a key part of this."

The brutal lessons of the war in Ukraine and the collective experience of the battle group since it was stood up in 2017, have highlighted those shortfalls in the battle group's capability. So, like Chinook helicopters, M777 howitzers, up-armoured LAVs, and strategic airlift for the war in Afghanistan, the three have been deemed urgent operational requirements (UOR) and are being fast-tracked through the procurement system for delivery to the battle group by the summer of 2024.



A tripod-mounted two camera detection system during the Counter Uncrewed Aerial Systems sandbox hosted by the IDEaS program in September 2022. Photo: IDEaS

“The current situation in Europe is a threat to the global security balance. The Army must have the critical enablers that the modern battlefield demands,” said Army commander Lieutenant-General Jocelyn Paul. “These capabilities are needed to ensure freedom of action and to protect our soldiers deployed as part of Operation Reassurance. The UOR designation is not a way to bypass the normal procurement process. And we recognize it cannot be a permanent solution to capability shortfalls. We’re going to make every effort to mitigate the impact on existing projects.”

Of the three, the portable anti-X missile system (PAXM) will likely be the most straightforward to acquire and integrate into operations. The Army has considerable experience with anti-armour weapons. The BMG-71 TOW wire-guided missile system is the primary anti-tank weapon of the mechanized brigade groups, and Army inventory includes the Carl Gustaf recoilless rifle and the M72 LAW rocket propelled grenade launcher. None, however, is “sufficient for the role that [is required] in Op Reassurance,” observed Colonel Dave MacIntyre, Director of Land Requirements (DLR).

In addition to a weapon system able to destroy a main battle tank that is truly soldier portable, from the company down to the section level in the infantry, and can be operated by a two-person crew, the Army is seeking a missile with a minimum range of 2,500 metres, between the approximately 350 metres of the Carl Gustaf and 3,500 metres of the TOW.

“There are a couple of fourth and fifth generation anti-tank guided missile systems available that would bring a lot of new capability to the Army,” said MacIntyre. A request for proposals (RFP) was issued in March and a contract could be awarded by mid-2023.

The intent of the UOR is not to replace either the Carl G or the TOW yet. The government donated as many as 100 older-model Gustaf M2 line-of-sight weapons to Ukraine last spring and will likely seek to replace that inventory with the much newer M4 variant or a similar system. And the Army investment plan includes an anti-tank guided missile replacement (ATGMR) project, identified in the government’s 2017 defence policy, that is proceeding through the procurement process.

Rather, the capability, which would include missiles, simulators, and any necessary training, would go directly to the battle group in Latvia as one of its primary portable anti-tank guided weapons.

At the same time, it will inform the DLR project team about those future anti-tank requirements. “We’ll learn lessons similar to a buy-and-try, hopefully with more of an operational focus,” said MacIntyre. “That will help inform ATGMR and the direction it goes when it does move into the procurement stage.”

Air defence and counter UAS (CUAS), though not interdependent, are considered a layered response to an aerial threat from drones and long-range artillery that has been on full display in Ukraine and in the ongoing conflict



A member of the 12^e Régiment blindé du Canada with a Raven-B miniature uncrewed aerial system during Exercise Rafale Blanche in January 2023. Photo: Cpl Jonathan Leclerc

between Armenia and Azerbaijan.

“These two systems are being acquired with that in mind,” said MacIntyre. “The two effects are complementary, but they won’t always necessarily be working in concert with each other.”

For air defence, the aim is to deliver a very short-range (VSHORAD) interceptor, either tripod or shoulder mounted, able to defend against attack aviation, close air support aircraft, and various small and midsize UAS. It must also connect with Canadian and allied air space coordination centres and other networks for a comprehensive air picture. The system will reside with the 4th Artillery Regiment (General Support) as “a new structure item,” he said.

While air defence provides the hard defeat of aerial threats, including from hand launched Class 1 UAS and larger, a mounted or dismounted CUAS system will detect, identify, track, and then degrade or defeat mini and small drones through “other means” such as disabling and jamming.

“Similar to air defence, CUAS has an element of complexity associated with air space control, identifying friend or foe, but the way those technology blocks fit together is why we have two separate projects,” MacIntyre explained. “They look at different problems, but at the same time, they need to be layered and work together.”

CUAS will be acquired in phases, first as a dismounted and fixed site system, and then as a vehicle-mounted fully integrated system. Since the UAS threat is

a concern for the Navy defending port operations and the Air Force defending airfields, both services will also receive systems through the UOR process.

The Army is analyzing options for both the air defence and CUAS projects and anticipates awarding contracts in 2023 and 2024. Both systems are expected to reach initial operating capability by the summer of 2024.

Critically, both will also help to reinvigorate the Army’s air defence community. Though the last air defence system — the Oerlikon dual-purpose short range surface-to-air and anti-tank missile system (ADATS), mounted on an M113 chassis — lapsed in 2012, the 4th Regiment (GS) has retained the expertise “to be able to start this from a walk,” MacIntyre said. “It won’t be from a standstill.”

The regiment, part of the 6th Canadian Combat Support Brigade, based in Gagetown, New Brunswick, currently provides the Air Space Coordination Centre (ASCC), the medium range radar, and the CU172 Blackjack small UAS, and will deploy a battery once the air defence systems are delivered.

“They have maintained our ability to plan and execute air defence operations in a coalition environment, and the fielding of the (recently modernized) ASCC vehicle, a brigade level asset, which forms that communications hub for an air defence capability,” MacIntyre noted. “They will form the basis of the air defence troop and it will become the centre of excellence for air defence once again.”



A member of The Royal New Brunswick Regiment on Exercise Strident Tracer in Gagetown in August 2016. Photo: WO Jerry Kean

Moreover, the UOR acquisition will allow the regiment to spend time with the system before the Ground-Based Air Defence (GBAD) project, also navigating its way through the procurement process, delivers in the late 2020s. In addition to the “shooter” to counter rockets, artillery, mortars, air-to-surface missiles, bombs and drones, GBAD will acquire a sensor suite, fire control software, networked command and control, and immersive training, including upgrades to ranges.

“The approach isn’t to use this UOR procurement to enable GBAD,” said MacIntyre. “But we will certainly be looking for the lessons learned on how it’s employed, some of the technical limitations, how effective the effectors are in an operational space, and the communications and network integration, which will grow over time. I think it will help to de-risk the overall GBAD project.”

A CUAS project was among DLR’s unfunded pre-identification programs. But a lot of preliminary work had been done to understand the technology, he said, “so we were able to turn that into a UOR project fairly quickly.”

“We knew it was a burgeoning space. If it wasn’t clear before [Ukraine], it’s extremely clear now that CUAS forms a very important part of operations in the modern battlefield.”

Among the mandatory requirements for all three UORs are cost and availability. Meetings with manufacturers have included discussions

about the “timelines and turnaround” for military off-the-shelf solutions, MacIntyre said. In all three cases, there was interest, and assurances about schedule, from multiple companies to proceed with a “limited competitive procurement,” rather than through sole-source contracts.

The new priorities come at a time when DLR is moving 40 major capital projects through the system, many of which are transitioning from options analysis to the definition phase, with deliveries planned for the 2027-28 timeframe. In addition, there are around 40 more projects accumulating in the pre-identification phase. All that with a modest staff of about 90 personnel.

Because of their direct links to projects already in the pipeline, the UORs will not be “wasted effort” for the broader DLR program, MacIntyre said, but they will change priorities slightly in the short-term.

“We’re using some of the same teams to deliver the UORs as we would be for moving the larger projects, so it means those larger projects aren’t getting the same level of throughput. And from a process guy’s point of view, that’s the wave we have to prepare for. The [defence policy] gave us a real uplift in Army capability, which on its current trajectory will look like a momentous shift and inflection point. But we have an opportunity to de-risk some of those projects and perhaps better understand what capabilities the Army needs before the RFP goes out.” ■



Members of the 4th Artillery Regiment (General Support) conduct man-portable air defense (MANPAD) training during Exercise Turbulent Winds in October 2016.
Photo: Cpl Geneviève Lapointe

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Digital Experiments

As part of a new digital strategy, the Army is encouraging more tech experimentation, down to its lowest levels.

By Chris Thatcher

Got an idea to further the Canadian Army's digital transformation? A trial of new technology for your brigade? An experiment with digital tools or new ways of employing them for your company?

If so, there's a team in Army headquarters that wants to hear about it. And soon, there will be an app to capture suggestions and help the Army decide in which ones to invest.

"Ultimately, we want every soldier to be a force developer," said Brigadier-General André Demers, Chief of Staff, Strategy (COS Strat).

Last summer, the Army released a digital strategy, titled *Modernization Vital Ground: The Essential Digital Pivot to be Effective in the Pan-Domian Fight*. Originally one of 20 initiatives nested in the 2020 *Canadian Army Modernization Strategy*, digital transformation has been elevated to its own pedestal and positioned as the vital ground the Army must seize if it is to modernize for a rapidly evolving technological fight.

"We are really recognizing that to do the transformation we want to do from an Army perspective, the first step is to move into the 21st century from a digital perspective," Demers said. To maintain integration and interoperability

with allies, "the common language will be the digital network — without that you are not a modern fighting force."

The strategy is an acknowledgement that the Army must change its entire relationship with technology, at every level and in every function. And that won't happen unless the force is willing to experiment — to encourage "participative force development" and trial emerging technology down to its lowest echelons.

"We want to make sure that every soldier that comes up with a good idea can test it, and that there is a way to feed it back through the system that will then influence our conceive and design process and drive doctrine, that will then drive more experimentation, that will drive equipment procurement," Demers explained. "We need to be better at capturing that."

The strategy has five aim points to help "guide" Army units and members on a transformation path, explained Colonel Dan McKinney, Director Land Command and Information (DLCI) and the document's lead author. The first is a cultural pivot intended to accelerate digital innovation. The second is digital leadership, spearheaded by a leadership hub within Army headquarters. Third is participative force development, encouraging experimentation from the lowest levels up. Fourth is integration of technology in day-to-day business processes. And the fifth is interoperability, specifically through experimentation with allies at events like the U.S. Army's Project Convergence and the multinational Bold Quest.

The document acknowledges that many of those aim points are also among the potential barriers to successful change, especially the suboptimal digital culture, digital literacy, leadership, expertise, procurement practices better suited to large platform projects, and maintaining interoperability as partners like the U.S. Army advance more rapidly. "We tried to capture all the challenges we would face," said McKinney.

No potential barrier is more prominent than leadership. Disrupting people's comfort with the status quo is a major obstacle, Demers admitted, "but to get this moving forward, we want to make sure that the leadership is supporting this."

The strategy was among the first documents reviewed and endorsed by Lieutenant-General Jocelyn Paul when he assumed command of the Army last summer, and digital transformation has been an intense focus of Army Council. The Army is in the process of creating a new directorate solely focused on Digital Transformation, under COS Strat, that will serve as the link with "participative force development" from across the Army.

"The best way to get buy-in is to get soldiers excited about this through grassroots experiments," Demers noted. "But the biggest way to address (obstacles) is command buy-in, and we have that with the current leadership. Once we get over our ability to resource it properly, recognizing that we will need to make investments from some other areas into the digital transformation, then we will be well on our way."



Photo: MCpl Dominic Duchesne-Beaulieu



Members of 34 Canadian Brigade Group during Exercise Xerus Endurci near Montreal in October 2022. Photo: MCpl Dominic Duchesne-Beaulieu



Two members of the 12^e Régiment blindé du Canada control a Raven-B miniature UAS on Ex. Rafale Blanche in January 2023. Photo: Cpl Jonathan Leclerc

The app to collect and assess soldier suggestions is still in the prototype phase. But once ready, it will have pattern recognition to be able “to do some match-making” and allow soldiers to connect ideas with similar intent, McKinney said. “The idea is to have a pipeline intake process so we can then decide more centrally what we will invest in.”

MORE HEADS ARE BETTER THAN ONE

The crux of participative force development is digital advancement through experimentation, drawing out ideas from soldiers and facilitating more collaboration with the private sector on technological solutions at a stage in defence procurement where the military and industry do not typically engage.

Though the strategy is less than a year old, already examples are emerging of innovative trials. Several companies joined a mortar platoon to demonstrate networked digital fires (see page 33), and a number of companies collaborated with 2 Canadian Mechanized Brigade Group Headquarters and Signal Squadron on maintaining the resiliency of the command and control (C2) function of a command post or headquarters in dispersed operations against an enemy with modern sensors and precision-guided weapons.

Borrowing a page from the Covid pandemic playbook, where company employees had to disperse and work remotely yet still adhere to corporate command, the trial sought to replicate that on the battlefield (see page 32).

And in May, during Exercise Maple Resolve, the Army will partner with Amazon Web Services to experiment with the provision of a tactical network as

a service. For the first time, the opposition force, played by the 12^e Régiment blindé du Canada, will operate with a digitized C2 network as it confronts the rest of 5 Canadian Mechanized Brigade Group.

“What we are trying to get out of it is lessons learned,” McKinney explained, that can inform the Army’s Land C4ISR projects. “We are going to deliver a tactical effect for Maple Resolve, but really the strategic goal is to help us figure out what the healthy mix of partnership with industry is going to look like in the future. How much of the solution do we want to be with industry as a service, and how much do we truly need to own ourselves?”

Expanded experimentation is an effort to break from the historical pattern of asking industry for a specific solution to an Army problem. Instead, the Army is hoping that by exposing industry directly to its “problem space,” the collaboration will identify approaches or solutions more quickly than either might have developed on their own.

“The idea behind the experiments is to allow industry and the field force to work together to figure out what is needed to solve the problem,” McKinney said. “There is a lot of innovation happening in the private sector, and for the military to be competitive we have to be fast followers to what is possible.”

Moreover, the experiments generated through participative force development are an indication of the Army’s willingness to innovate and “trying new ways of doing business,” said Demers.

Current procurement practice does not offer much flexibility for adapting to the fast pace of technological change, and experiments will need to be

followed by funding for industry to remain engaged. But the experiments show the Army is “willing to take risks,” he said. “As we are engaging internally with the broader procurement community – they are tracking what we are doing – these are proof of concept of the way we can evolve this forward.”

Just how far the Army is prepared to go in the application of technology through contracted services is still being debated in wider National Defence circles. But there is a desire to expand the space in which industry can operate. The military will need to own the “kill web,” said McKinney, but the Army is open to software, infrastructure, and other areas as a service.

“These are part of the ongoing discussions,” he said. “We are running these trials to see what are the changing rules when you partner with industry like this, what are the changing rules with the field force? We have learned some interesting things, but we are still developing the technology.”

ZERO DAY INTEROPERABILITY

While greater experimentation is a key to digital transformation, the Army’s capacity to do so is limited, Demers acknowledged. It will continue to leverage Defence R&D Canada as much as possible and has recently “re-energized” the Canadian Army Land Warfare Centre (CALWC) with more resources and a shorter horizon focused on the conception and design of hi-tech capability through more agile procurement. In particular, CALWC aims to “accelerate” the

conceive and design cycle of the Army’s three urgent operational requirements intended for the augmented forward presence battle group in Latvia — anti-armour, air defence and counter-uncrewed aircraft systems (CUAS) — to ensure they have the necessary doctrine supporting them.

“We need to make sure that as we deliver those to the field force, we have the concept and doctrine and structure to integrate them,” Demers explained. “Anti-armour for an infantry battalion is not that complicated to integrate, but CUAS or reinvigorating our air defence, with the technology of today, needs a bit more thinking behind it to make sure we integrate with the Air Space Coordination Centre and various communication networks that are available within a coalition.”

Once those capabilities are delivered to the battle group in Latvia and reach initial operating capability, likely by the summer of 2024, CALWC will resume its primary focus on the Army of Tomorrow, but with a greater emphasis “tied to digitalization,” he said, as the Army delivers the Land C4ISR projects that will provide its next-generation information highway.

Those six projects are central to harnessing the Army’s data. However, the strategy flags interoperability with allies and, in particular, the ability to share raw data, as a potential stumbling block. Through NATO working groups, the ABCANZ Armies (American, British, Canadian, Australian, and New Zealand) framework and experiments like Project Convergence and Bold Quest, the

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A member of the 2nd Regiment, Royal Canadian Horse Artillery, passes information during artillery fire as part of the Basic Tactical Aviation Course in Petawawa in March 2022. Photo: MCpl Laura Landry

Army hopes to remain in step with the digital pace of partners who are rapidly advancing their networks.

“The goal is Day Zero interoperability,” said McKinney, meaning Canada must demonstrate in experiments and on binational and multinational exercises that it can plug in seamlessly and share data, not “just show up [as part of a coalition] and figure it out.”

For Project Convergence 22 last fall, the Army commander led the Canadian delegation, a clear signal “that we are serious about integrating more and more into the experiments,” noted Demers. That included experiments on intelligence, surveillance and reconnaissance (ISR) sensor integration and precision targeting. Both of those will be among the many threads at the next Project Convergence (PC) in the spring of 2024, but tied to data management and conducted at the tactical edge.

“We are looking at a niche capability the Canadian Army can provide at the strategic-operational level to make sure we stay a relevant partner within those experiments,” he added, noting that more units within the Army are looking for opportunities to participate.

“We are looking at the outcome of those experiments that have happened so far to instruct not only how we are going to participate in PC 24, but also how we can use some of the work that has been done to accelerate our own force development process.”

“All of this is not possible without a network that is interoperable and

‘federated’ with the experimentation network they are using for Project Convergence,” stressed McKinney, who in February led a team to U.S. Army Futures Command “to do a deep dive into network integration and sensor integration, to make sure we are ready for the next PC.”

Digital transformation at the tactical edge will be an ever-evolving effort as the technology changes. While there is no end-state, the Army does envision a desired state of revolutionized decision-action cycles through new uses of data and the ability to “integrate, synchronize and visualize Land domain effects within a larger pan-domain context.”

For soldiers operating at that tactical edge, one of the objectives of the strategy is “to have unprecedented agency from the field force on their own digital tool set,” said Demers, setting them firmly as vital digital contributors in that broader domain battle.

Already, experiments such as 2 Brigade’s decentralized command post have “changed the attitude and emboldened people within the Army to try things,” said McKinney. “I’m fielding requests from all over the place to support different trials.

“I would say we are just getting started,” he emphasized. “We’re now in the assembly area, the main force is moving to the line of departure, recce elements are forward of the line already, but we haven’t crossed the line of departure ‘en-masse’ yet. That starts with all the projects being unlocked. This is a huge piece to move. We are talking transforming the Army.” ■

KWESST Digitization Centre of Excellence (CoE)



YOUR PARTNER IN BUILDING SOLDIER **LETHALITY** AND **SURVIVABILITY** THROUGH **MODULARITY** AND **ADAPTABILITY**

The KWESST Digitization CoE is focused on meeting this challenge. The KWESST Digitization CoE provides agile, reliable, and rapid responses to support specific 'tactical edge' systems integration needs. The company's capability and product development strategy is deliberately focused on enabling operators and soldiers at the "tactical edge" through a three-layered architectural vision that guides its product and capability development strategies, and has, at its heart, a Modular Open Systems Architecture (MOSA) integration and data-exchange approach:

• *Tactical internet of Things (IoT) Layer*

- ▶ Design and development of niche sensor and effector products that enhance operator/soldier Lethality and Survivability

• *Tactical Edge Data Integration and Processing Layer*

- ▶ Enabling Modularity and Adaptability
- ▶ Team Awareness Kit (TAK) as a foundational battle management building block
- ▶ Integration with any of the latest MESH Communications solutions
- ▶ Power and Security Management
- ▶ Supporting EUDs, Hubs and mission manager hardware

• *Enterprise Command and Control (C2) Gateway Layer*

- ▶ Modularity and Adaptability thereby enabling integration into higher level
- ▶ Common messaging and data standards
- ▶ Integration into higher level security architectures



KWESST PhantomTM TAK integrated Tactical Electro-Magnetic Spectrum Operations (EMSO) System



KWESST 81mm Mortars TAK Integrated Fires Module (IFM)

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DISPERSED COMMAND

A FIELD EXPERIMENT PROVES A COMMAND POST CAN BE DECENTRALIZED AND MOBILE, YET REMAIN DIGITALLY CONNECTED.

In the early days of the war in Ukraine, one of the more startling figures was the casualty rate of Russian command posts (CP). In the two months following Russia's February 2022 invasion, Ukrainian forces located and destroyed "no fewer than 31 Russian command and communications posts," according to a *Forbes* article that April. Within the first three months, reports emerged of the loss of more than 40 battle group, brigade, and division CPs.

"That was pretty much a wake-up call," Major Nicolas Gonthier, the commanding officer of 2 Canadian Mechanized Brigade Group Headquarters and Signal Squadron (2 CMBG HQ & Sig Sqn), acknowledged. "The concept of employment of the signal squadron and the way we deploy our CP would simply not survive."

The current structure of Canadian command posts is a holdover from the conflict in Afghanistan, where "everything was extremely centralized and focused on providing high digitization," he noted. Most have gotten bigger and take longer to deploy and move. With the plethora of drones, sensors, electronic warfare, and the resulting high-resolution imagery, those large CPs, with their high digital signature, would be an easy target.

Gonthier, who assumed command of the squadron in July, and Colonel Jay MacKeen, commander of 2 CMBG, also newly arrived that summer, discussed the problem and quickly agreed, "we need to change this."

In seeking greater mobility for CPs, the signal squadron had in the past wrestled with the conundrum of speed and mobility versus digitization. Would they have to compromise on connectivity to achieve increased survivability?

Last October, during Exercise Hermes Reach, they were challenged to try both — develop a highly interconnected but decentralized brigade CP that could deploy in under 30 minutes. And, as an added wrinkle, do so with less than half the normal complement of staff.

Gonthier, a signals officer with a degree in computer engineering, who spent six years with Canadian Special Operations Forces, set out three primary objectives for the team: Split the normally large CP of over 50 staff into smaller units, or nodes, that could deploy independently in the battlespace; have each of those nodes deployed and fully connected with all their normal applications functioning within 20 to 30 minutes; and, due to the ongoing struggles with recruitment and retention, especially in the signals trade, do it with far fewer operators.

"It was a pretty challenging objective," he said. "How do you distribute the network at the same time as you deploy your various commands, and with less

2 Signal Squadron tested a de-centralized camp on Exercise Hermes Reach in October 2022. Photo: Cpl Sarah Morley



Networked Mortars

With the doors open for “participative force development” across the Army, you can expect to hear about more digital capability being field-tested on unit exercises.

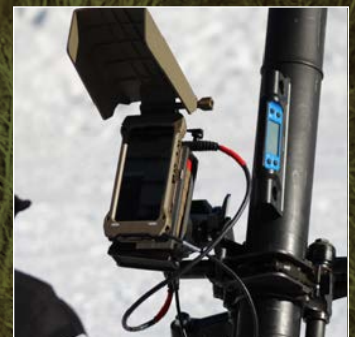
In late January, members of the 3rd Battalion, The Royal Canadian Regiment (3 RCR), and 2 Canadian Mechanized Brigade Group (2 CMBG), working with representatives from KWESST, Thales Canada, and Base Camp Connect, conducted a trial of a digital fires solution during a live fire 81 mm mortar exercise in Petawawa.

Working with the 3 RCR mortar platoon, the participants demonstrated a digital fires network by integrating KWESST’s ATAK-equipped integrated fires module mounted on several mortars and generated call-for-fire messages via KWESST’s ATAK-based dynamic call-for-fires application, shared in real-time with a Fire Direction Centre and a Fires Support Coordination Centre (FSCC).

“We are supporting a mortar platoon, but really enabling a digital fires network,” explained Rick Bowes, strategic advisor for KWESST’s digitization and counter-threat products.

“Showcasing our integration capabilities, KWESST also demonstrated a preliminary application programming interface (API) between the soon to be adopted Brigade level C2 software (Sitaware HQ) and ATAK. This level of integration also enables NATO interoperability for the Canadian Army given the continued adoption of Sitaware and ATAK by many NATO nations.”

Through a Starlink-based uplink and an MPU5-based high bandwidth Mobile Ad Hoc Network (MANET), “we were able to bring in intelligence, surveillance and reconnaissance imagery from a drone camera and share that throughout the network on the range,” he said. “We also integrated Thales’ SOPHIE Hand-Held Thermal Imagers and Target Locator into ATAK so we could take geo-tagged imagery into ATAK, which was part of the call-for-fires message, which was then shared instantaneously throughout the network.” ■



Photos: KWESST



Working with defence companies, 2 Signal Squadron employed a combination of military software and open-source tools to allow the command post to remain networked.
Photo: Cpl Sarah Morley

people.” As with any complex problem, the squadron quickly determined that “we had to completely change our mindset.”

As per the Army digital strategy aim of expanding “participative force development,” 2 CMBG HQ & Sig Sqn turned the two-week exercise into an experiment with the defence industry, inviting both current suppliers of the Army’s Land Command Support System and companies whose capabilities had caught their attention to participate.

“We have some capabilities within the unit that we use at maybe five percent of their capacity,” Gonthier noted, “so we reached out to industry and said, ‘We have your equipment, we know we can do more with it, but we need your help.’”

With no blueprint for such a decentralized CP concept, the squadron first confirmed the ability of existing equipment and capability that had been validated the previous May on Exercise Maple Resolve, and then began generating a prototype. Within 45 days, they had a solution to trial.

Over three days on Ex Hermes Reach, members of the squadron worked alongside Canadian Armed Forces (CAF) technical experts and industry engineers, with reach-back to others in their companies, to experiment and integrate various capabilities before testing the concept in a five-day scenario-based “deployment” in the 4th Canadian Division Support Base Petawawa training area.

Employing a combination of the Tactical Assault Kit (TAK) suite of tools, including WinTAK (Windows) software and mapping frameworks and ATAK (Android) applications, as well as open-source tools to track information and communicate, the team was able to build a suite of applications to allow CP staff to collaborate virtually, sharing a common operating picture (COP) and accessing the battle management system.

They employed a mix of military and commercial SATCOM solutions and integrated mesh network radios to share data among the command “nodes.” The squadron set aside its cumbersome array of antennas and trialled “different types” of more automated masts that could be deployed in minutes, rather than hours, to extend their signals. That included static, high-altitude drones, tethered to a generator.

“We had various technical capabilities being integrated,” said Gonthier. “It gave us a whole new C4ISR architecture, as a first prototype, that could bring value to the staff and the commander.”

They were able to show that a CP staff could maintain access to the COP, track troops, and plan and manage the battle, talking without disruption to enablers and, critically, communicate without using the tactical radios that emit a strong signal.

“This allows us to reduce our footprint, to hide within the noise,” he said. “It’s not like in the past, where we’d have our antennas in one location, like the sun in the sky where it’s evident to find and target. We were able to distribute emissions across multiple locations.”

While dispersing the CP to reduce its signature was a driving objective, signature reduction was not a primary aim for this first trial. “Every time you put reducing emissions as a core requirement, you always end up with pen and paper,” Gonthier observed, so the focus was on “building the best architecture possible and then, in a future iteration of the concept, focusing on how we make this more resilient and less detectable.”

Ultimately, the experiment was able to show that a normally centralized CP could disperse and move, while remaining connected and highly digitized. And do it quickly. “Instead of taking hours, like six hours plus, we can do it within the first 30 minutes of deploying,” he said.

While the results were important, so too was the journey for the squadron and brigade. Innovation can be a slow-moving process in the military. The signal squadron had a prototype within two months and a follow-on iteration a month later.

The process has continued to evolve as more companies have engaged. From five at the outset, the squadron has now discussed technical solutions with 10 and counting.

Gonthier credited the collaboration between the military and industry for much of the momentum. "Initially, the expectation was, 'Let's do our best, let's try to build a decentralized CP.' But that concentration of industry engineers and members of the Sigs squadron was so effective, that within days we had a concept that was viable, and achieved high digitization and integration of the various capabilities from the various vendors.

"Sometimes industry has the engineering capacity to build equipment and prototypes rapidly, but they don't necessarily know exactly what problems to tackle," he added. "With this pairing, one of our corporals might say, 'I wish that radio would do this.' The engineer would make a phone call back to the company, and a firmware upgrade would be built, and then sent back the next day. It was beneficial to both — for us to be able to influence the type of product we received and how it was integrated, and for industry to see and hear problem sets from the troops themselves."

The experiment could also inform Army acceptance of contracted services. The digital strategy recognizes the impact of Everything as a Service and the need to use it where applicable. There will always be a debate about what the Army needs to own and what can be provided by a third party, especially at the

tactical edge, Gonthier observed, but "there are definitely some things that only industry can provide.

"There are some tasks that are very military specific, workflows that are very military specific, that the best solution we can have is a small software development team that builds a custom tool for ourselves," he said. But for services like battle management suites and radios with large military markets, "there's no value for [us] to build a custom solution."

The CP experiment has generated strong interest among Army and CAF leadership, and will likely transition at some point into a framework for a brigade command post on Operation Reassurance in Latvia.

What began as a unit initiative has now become part of the Army's modernization effort, Gonthier said, injecting a lot of energy into 2 Signal Squadron's future digitization goals. "Lots of the lessons learned from our experimentation now feed into the bigger institutional capability development. And that is the goal for the future. We're looking at having experimental units, where they're going to keep doing innovation and experimentation as a permanent line of effort.

"I think from an institutional standpoint, we have perfect synchronization. We have bottom-up ideation and experimentation for a problem that affects us directly as practitioners and operators. At the same time, we have a digital strategy that gave us the leverage and the support we needed to conduct this. It was the perfect alignment ... and now we have the perfect example of everything coming together." ■



Researchers with DRDC trialled a newer and lighter 30-meter high-capacity line of sight tower. Cpl Sarah Morley

In COBALT, a C2 Backbone

By Ian Coutts

When Thales Canada's Neil Marshall, director of strategy, explains the problems that bedevil the Army's command and control (C2) communications in the field, you get the feeling he'd like to give the boot to that adage about generals forever preparing to fight the last war.

In the 1990s, the Army was looking to replace its obsolete analogue C2 systems. The Iron Curtain was gone, but its influence remained. So, he says, "We designed a digital system in the early 90's that was designed around fighting a Cold War-type battle.

"Around the time we delivered that, Canada found itself deeply committed to Afghanistan, which was more counter-insurgency — large areas of operation, troops spread all over, intelligence-driven — and we found that the system we had developed for the Cold War wasn't fit for purpose."

The solution was to build a new C2 network, one that reflected these new realities. "By the time we fielded it," said Marshall, a former signals officer, "we had more or less withdrawn large combat

formations out of Afghanistan."

Instead, the Army was now thinking about potential conflict featuring manoeuvre warfare against a near-peer enemy. As a result, "Canada is renewing its command and control once again," he said.

We could do what we've done in the past — create something based on what we think we're likely to face. But experience has shown us that when trouble starts, "we're not going to have what we need," Marshall said.

Thales believes it has a solution — the COBALT Mission Backbone C4ISR system. COBALT is what the company refers to as a "system of systems." It's an overused term, Marshall admits, but he means it in the sense where "Thales provides a core network onto which other systems can be deliberately bolted on, creating a whole that is greater than the sum of its parts."

Those systems "can be voice communications, data at the tactical edge, data at a higher headquarters," he said. COBALT creates a spine

— a mixture of hardware, software and networks working together — that can link them all.

That gives COBALT the flexibility to ensure that, when it comes to C2, the Army isn't saddled with trying to fight the next war with the last war's tools. In a counterinsurgency environment, it can be configured to work more as a tool for disseminating intelligence from a central source, while in a peer-to-peer battlefield environment, it might be used to share data to accelerate decision-making in a dynamic and fluid context.

To help COBALT do this, Thales is looking to a range of small- to medium-sized businesses to supply products that could be — and, in fact, some already are — plugged into the COBALT network. These companies are leaders in their respective niches, and Thales sees in them an infinite potential to innovate.

As an example of what they're thinking, Marshall cites Tacteris. "They build a really cool planning software that has a way of synchronizing time and space that I have never seen before."



Members of 2 Canadian Mechanized Brigade Group Headquarters and Signal Squadron operated in a decentralized command post environment during Exercise Unified Resolve in February 2023. Photo: Cpl Aimee Rintjema

It's self-contained, but Thales could provide the tools to make it interoperable with COBALT. "That would allow us to say to Canada, 'Look, here's a really good piece of software. If you like it, you don't need to build a standalone system for it. It's available on COBALT.'"

Drawing on the expertise of such firms — and the company's researchers internationally — Thales could add on imaging technology, map software — whatever the mission requires. "In the aggregate, and as part of a coherent system of systems, the whole becomes far more viable, attractive, and valuable to soldiers than standalone systems," Marshall said.

As open-ended as it seems, one element that COBALT will share with previous command and control systems is the primacy of voice communications. "In the chaos, uncertainty and danger of operations, hearing the voice of your commander, that calming voice, will always be important," he noted.

What COBALT would do, however, is remove the chatter about situational awareness that fills up that limited pipeline in operations. "If you could take that and make it data, it would take a fraction of a second to send and leave that voice channel

free for other things."

Thales is also looking at products that could be plugged into COBALT to make that spoken communication more effective — for example, software capable of real-time transcription or, and this is actually on the horizon, translation software that could render English into French or any other language almost as it is spoken.

What could this mean in operations? "If I had to sum it up in two words," said Marshall, "I'd say, collaborative combat."

Consider the case of a troop of armoured vehicles moving into a town. "It starts with the planning. They have to understand the terrain. That's where COBALT comes in. It would give the troop commander the ability to pull higher-level intelligence into their system. They could take their orders and overlay them on a map that gets shared to everyone. It enables both blue and red force tracking. It'll help you build basic situational awareness. Where are the other callsigns, including the dismounted ones? Where is everything?"

As the troop moved through that town, COBALT would let them share that awareness. "[If] you have a micro UAS (uncrewed aerial system) up,

you're able to share that. If you're in contact and under fire, if someone sees a target but can't engage, that information can be transferred to others," he explained.

If the armoured vehicles were working with a tank, "I can target with my laser finder and pass that info onto the tank." The collaboration is vertical as well as horizontal. "At the same time, you can pull from higher level assets that are watching in real time."

There are obvious limitations on the bandwidth usually available to those units at the tactical edge, but "if there's one vehicle that, for whatever reason, requires massive bandwidth — say it's going to be in control mode — that's fine," he said. "We can take increased connectivity and push it down."

When Thales demonstrated COBALT last year at CANSEC, Canada's largest annual defence trade show, "we had great feedback," said Marshall. Is the Army likely to adopt it? "I can't announce any specifics, but there is definitely interest out there." At this point, he pointed out, "it's less about winning bids than trying to solve problems. We're continuing to build out COBALT based on that feedback." ■



A Communication and Information Systems Technician adjusts a satellite dish at a backcountry patrol base during Operation Podium in 2010. Photo: Sgt Frank Hude

PUSHING SMART GEOSPATIAL DATA TO THE TACTICAL EDGE

BY CHRIS THATCHER



Members of the 12^e Régiment blindé du Canada conduct a briefing on Exercise Sabre Auclair in October 2022. The exercise included mounted reconnaissance, hasty attacks, delay manoeuvres and counter movement. Photo: MCpl William Gauvin Poirier

In late 2006, a series of storms swept across southern British Columbia, flooding communities, triggering landslides, and bringing heavy snowstorms. On Dec. 14 and 15, as the weather appeared to be calming, a devastating windstorm that exceeded 150 kilometres per hour uprooted old-growth trees, left more than 250,000 residents without power, and caused over \$100 million in damage.

Major (Ret'd) Mathieu Primeau, a combat engineer, was deployed as the chief geospatial officer as part of a Canadian Armed Forces (CAF) response to assist the region. Over three months, he and others on his team drove and walked hard drives and CD ROMs between municipal and provincial government offices and agencies to share maps and data about conditions on the ground.

Flash forward 15 years to November 2021, when two atmospheric rivers caused massive flooding, mudslides and landslides, and destroyed infrastructure in 17 regional districts in the province. Data flowed seamlessly between governments, emergency management agencies and the CAF. Even residents, using Google Maps, knew almost instantly which roads were impassable.

"They were all working with the same data sets, with the same software, and using common tools to work and communicate what was happening, often in real time," observed Primeau, now Esri Canada's senior customer success manager for the federal government. "What took a month and a half of my work in 2006, took a few minutes in 2021 to confirm we could support what our government officials required."

When it comes to domestic operations, he believes Canadian Joint Operations Command has "cracked the nut" of collecting, analyzing and presenting data to provide commanders and emergency management agencies with the situational awareness needed to help Canadians in distress caused by natural disasters.

Expeditionary operations on foreign soil are a different story. Though the CAF has expanded its sensing ability over the past decade with small uncrewed aerial systems (UAS), medium range radars and other capabilities, Primeau contends the Army is trailing key allies when it comes to integrating and sharing data.

"When it comes to the ability to visualize a complex problem with our allies

and then make decisions, we have not evolved with our allies," he said. "There is huge potential to do so now."

It's a concern that the Army acknowledges in its recent digital strategy, *Modernization Vital Ground*. The 2022 document notes that the "modern battlespace is increasingly sensor saturated, with integrated, interoperable information systems and networks providing the backbone of our contemporary warfighting capability." And it emphasizes that if the Army does not evolve its systems to be able to "interoperate with our allies through the exchange of raw data, we will restrict the power projection opportunities and will be unable to contribute to coalition support of national interests."

POWER OF THE MAP

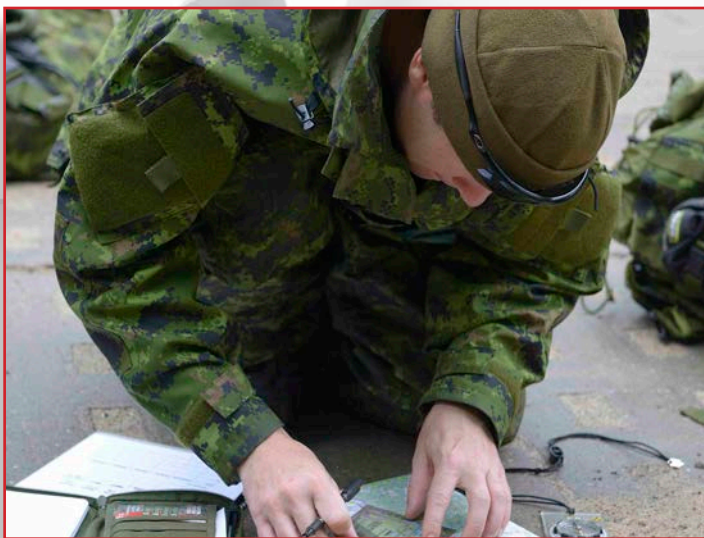
Most data has a spatial component. When well organized and displayed, that data doesn't just answer questions, it can tell a comprehensive story. And a good map, whether paper or on a screen, can provide a common operating picture with datapoints displayed. There's a level of comfort in that, Primeau acknowledged, but it falls well short of the geospatial information and intelligence that can be pushed to the tactical edge.

"Ultimately, a soldier in combat is trying to reduce ambiguity, trying to figure out what's the known from the unknown," he said. "The map and its geography is one of the key knowns: I am here, the enemy is probably there, I can flank them this way or see them that way, and probably fire from there."

Maps provide a "rational framework that allows the soldier to visualize – it's a key technology," explained Primeau, a geospatial officer and former commanding officer of the Mapping and Charting Establishment. "We haven't cracked the code on greater visualization. The assumption that a paper map is sufficient is grossly outdated given the ability to integrate all the sensors we have."

He's not suggesting soldiers ditch their maps, but "what you really want is that visual digital display with smart data" that can indicate where sensors are located, share imagery from a UAS, or perhaps alert soldiers to their range from enemy artillery.

"That is all possible," said Primeau, who also serves as a design thinking advisor and facilitator for national security organizations, "but we have not designed the mindset or the backbone to support this yet. This is the effort of



A member of O Company, 3 RCR checks his bearings while conducting a navigation exercise during Op Reassurance in Eastern Europe. Photo: Cpl Dolores Crampton



Capt Simon Johnson, operations officer of the eFP Battle Group in Latvia, briefs VAdm Bob Auchterlonie, commander of Canadian Joint Operations Command, in June 2021. Photo: MCpl Stuart MacNeil

the Army's digital team."

When Primeau talks of geospatial information enabling the lethality and survivability of a battle group or combat team in Adaptive Dispersed Operations (ADO) — the Army's future operating concept — he draws on U.S. General (Ret'd) Stanley McChrystal's team-of-teams model for nimble innovation and business operations. A shared consciousness of data is key to empowering the execution of ADO, he suggested.

"If we are going to have small teams make quick decisions in an overabundance of data, they need to be structured for it. They need to have things like local servers, especially if it is a denied environment in terms of cyber and connectivity, to be empowered to leverage sensor or C4ISR data to take decisions locally, yet still connect strategically to enable the larger operation."

In an ADO environment where "the whole element is mobile, you need agility down to the edge," he said. "And your edge person now is an infantry sergeant — 26 to 28 years old and a digital native — who can handle a lot more digital information than most headquarters people."

The Army's six Land C4ISR projects will address several current challenges related to gathering and moving information at the edge, Primeau noted, in particular a program to modernize sensors related to its intelligence, surveillance, target acquisition and reconnaissance (ISTAR) capabilities. But for geospatial and other data to be most valuable at that tactical edge, the headquarters elements like a combat team will require resident resources such as servers, processors, tools, and integrated sensors, connected to a more resilient cloud-based architecture when available, but also able to work with individual troops when denied or disconnected, "with the same data and applications."

He equated the possibilities for ISTAR with the modern capabilities of a delivery service like FedEx or Canada Post. What used to be a manual process to track and deliver packages is now almost completely digital and, where feasible, automated.

At Project Convergence in the spring of 2024, the U.S. Army's Future Command will experiment with a "tactical data fabric." This common layer is intended to bridge the enterprise level and the tactical edge by integrating massive amounts of data in multiple formats from multiple sources, and then

employing advanced analytics and machine learning to aggregate and package the information for decision makers.

The Canadian Army will be closely monitoring those experiments, what Primeau called "an open exploration of how data communicates among systems."

"This Project Convergence idea is where the next battle is," he said. "Twenty-five years ago, we would bring tanks, artillery, soldiers, engineers and work out combat arms tactics on the battlefield. This is the new tactics. We need to invest in data manoeuvre. It's now about how the data flows between the platforms, information systems and applications. If each of these has its own data repository, its own look and feel of tools, nothing will work. We need all the data in one place, talking to all the applications, with all the analysis shared."

The digital strategy notes the disruptive potential a shift to "Everything as a Service" (EaaS) could have on the military, but as the "digital solutions industry" undergoes "a significant pivot" from physical products to a service model, the Army should aim to alleviate "resources by outsourcing ... where applicable," it stated.

To get this right and identify the most effective solutions in a rapidly evolving digital ecosystem — consider the advances of AI in just the past few months — Primeau recommends several steps, starting with "envisioning" solutions together with academia, industry and defence scientists that answer the big questions about the Army's challenges (such as interoperability) and the types of capabilities soldiers and headquarters require.

Then, assess and organize the data needed for those solutions and understand how it will be viewed, shared and communicated across the battlespace, before bringing in the right people to lead and acquire the right tools. Once the Army has its vision, supported by the data, the right people will then identify the best and smartest solutions, he suggested. And those need to be continuously reviewed and upgraded as technology changes.

As with the geospatial information gathered during the B.C. floods, the determinant of a successful action was not the data but the information technology that permitted it to flow. Once the Army solves its digital infrastructure at the edge, it will have maps that are intuitive enablers and accelerators to solving complex problems. ■



A member of 2 Canadian Mechanized Brigade Group Headquarters and Signal Squadron on Ex. Unified Resolve in February 2023. Photo: Cpl Aimee Rintjema



Lt Shawn Hogan briefs a member of 5 Service Battalion on Ex Remorqueur Tactique in October 2021. Photo: Cpl Hugo Montpetit



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ENGAGING WITH INDUSTRY

To field high tech systems, the Army needs a better way to develop and test them with manufacturers.

By Chris Thatcher

Shortly after OpenAI released ChatGPT last November, millions of people began interacting with the artificial intelligence-enabled chatbot, testing its abilities and fretting about its possibilities.

For the military, it was a reminder of how quickly emerging technology can explode and then transform, as early adopters push its limits and companies then further innovate based on the feedback.

To capitalize on that type of a feedback loop, the Canadian Army needs a new and better way to engage with the defence sector, one that allows for the complexities of a competitive — and, at times, contentious — procurement process, while still providing the mutual flexibility to experiment with — and, hopefully, refine — proprietary equipment, systems and services.

The broad details of the Army's core programs are laid out in the 2017 defence policy, the 2019 modernization strategy and in the 2022 digital strategy, to name a few. While the current sample of industry outlooks, conferences and trade shows helps the Army share some of the finer points of its capability acquisition projects, they are just one piece of what could be a far richer and more beneficial partnership, especially at a time when NATO governments are urging their defence sectors to surge capacity.

"I hear loud and clear from industry that that's

not sufficient, that there isn't enough interaction at a level where we can help drive innovation," Colonel Dave MacIntyre, Director of Land Requirements (DLR), said in a recent interview.

"The resources that industry is putting into their own innovation are not being either well nuanced or harnessed by what's possible from an Army perspective."

Last fall, during the Best Defence Conference in London, Ont., MacIntyre acknowledged as much to a room of industry executives and called for a better way to collaborate and innovate.

The Army might be on a digital transformation, but the networks and tools that will facilitate that, especially at the tactical edge, are evolving at a pace beyond traditional procurement.

"We see the innovation that industry is able to do with a rather quick turnaround," he said, "and [current and prospective suppliers] perceive ways to update their capabilities or their offer for certain programs within the Army."

MacIntyre, an armour officer with the Lord Strathcona's Horse (Royal Canadians), is mindful of the defence policy aim of bridging the divide between "lead-up innovation and new procurement." He suggested a need for more "innovation opportunities" between the early phases of procurement, when the Army begins to identify gaps in a particular capability and analyze



A member of 33 Canadian Brigade Group on Exercise Stalwart Wolf in August 2022. Photo: S1 Anne-Marie Brisson



A boat assault by members of 33 CBG on Ex Stalwart Wolf in August 2022. Photo: S1 Camden Scott

possible options, and the later phases, when requirements are defined and industry proposals are sought.

"There's still some challenge in that space," he said. "But there are quite a few streams that I'm not confident we are exploiting to their maximum potential."

The Army could be doing more through the sandboxes, contests, and competitive projects of the Defence R&D Canada (DRDC)-led Innovation for Defence Excellence and Security (IDEaS) program, which provides opportunities to observe and guide industry innovation in controlled scenarios, he said. And DLR could expand its use of buying and trying small quantities of equipment for field tests to truly understand how soldiers will use it.

"All of those programs have soldiers at their heart," said MacIntyre, who served in DLR on multiple occasions between 2005 and 2020, and assumed the director's title in August 2022.

"When DRDC procures unmanned ground systems for a trial, it's our soldiers who then use those systems in realistic roles and exercises, and that informs both the development of that technology and, also, the projects that follow."

But for the hard problems of developing and effectively employing emerging technologies, especially at the tactical edge, more industry engagement is needed, he acknowledged.

One option MacIntyre raised is an Army-sponsored force development forum. Backed by a capability roadmap for certain technology themes, it could allow the military to lay out specific challenges and provide a space for industry to demonstrate solutions. It might also allow the Army to guide some industry investments. That in turn could be connected to DRDC experimentation, which could then transition to a "physical buy and try of equipment" to gather soldier input for a statement of requirements, he mused.

"The challenge in that case is about downstream contracting and procurement. That's not my department, of course, [but we] need to ensure that from a competitive process standpoint, no one is being excluded from the ability to provide solutions to the Army."

Another option already underway is collaborative experimentation between the field force and industry. Last fall, 2 Canadian Mechanized Brigade Group Headquarters and Signal Squadron (2 CMBG HQ & Sig Sqn) conducted a trial with as many as 10 companies, some sustaining the current Land Command Support System, that demonstrated several network solutions developed by industry partners.

"The innovative solutions that came from the field force, enabled by industry in the field at the tactical edge with us, was remarkable," MacIntyre said.

Soldiers and industry representatives "iterated software development" several times over two weeks, and came up with novel ways to engineer durable networks for a dispersed command post, writing and rewriting code on the fly.

"That's an example of a very quick turnaround, of us using those partnerships and existing contracting mechanisms to be able to get support very close to the tactical edge," he said. "All involved indicated that this is the way we need to be partnered in the future."

It's also an important signal for industry. The Army's new digital strategy recognizes the disruptive effect "Everything as a Service" could have on the "current capability acquisition paradigm." Trials of this type will be critical for building trust in industry-delivered services like networks and radios at the tactical edge.

Field units exercise to build warfighting skills, not for the sake of conducting experiments, MacIntyre noted, "so there's a limit to how much experimentation we can accept on these exercises." But the 2 CMBG HQ & Sig Sqn trial is "the first of many."

There's an obvious value to putting new equipment and technology in the hands of soldiers well before it's acquired, something the Army hasn't exploited enough, he acknowledged.

"[They] will use it in ways that you wouldn't

necessarily expect. That's not a negative. It allows them to develop how they're going to use that piece of equipment in the modern battlespace."

The Army purchased a small quantity of light tactical vehicles through a buy-and-try to better understand the options for light forces mobility. Experiments by the Army's three light battalions have significantly altered the statement of requirements that will soon go out to industry. Defining requirements without the benefit of that soldier input "is probably a failing on our part," said MacIntyre, who deployed to Bosnia, twice to Afghanistan, and domestically on Operation Podium for the 2010 Olympic Games.

"I think you'll see much more of that small, low-level experimentation to inform the development of future capabilities."

One of the challenges, though, could be funding, something industry will be looking for if it is to put significant resources and time into experiments that are not directly tied to an equipment tender. DLR has an envelope for minor capital projects valued up to \$10 million, "[which] allows me to procure small projects that will solve small problems for the Army," MacIntyre

noted, "but we're quickly seeing that at the current authority levels, that amount of money perhaps is becoming less able to meet gaps in requirements."

Continuous experimentation will also become a regular feature of the Army's "continuous capability sustainment," a new approach to maintaining systems and vehicles. Yearly tech refreshes might be routine for commercial technology like cellphones, but enhancing networks and software will require some adaptation, especially if trials with field units are required to confirm an upgrade before it's implemented. The money issue, however, will be more easily addressed once a contract is in place.

MacIntyre pointed to Royal Canadian Air Force aircraft fleets that have undergone substantial technological change over their service life as examples of how technology can be spiralled into a platform.

"I think the Army can harness some of those lessons and start to use this continuous capability sustainment concept in managing more agile technology cycles," he said. "That includes an increased partnership with the [manufacturer]

responsible for long-term sustainment and innovations."

Fortunately, iterations of technological development do not need to be fully developed and universally applied across the Army, in every mechanized brigade group or every specialized unit, to be considered ready for initial operating capability. Equipment can be acquired in smaller quantities and scaled up as it is brought into service and tested on operations.

As part of the digital strategy, the Army commander has indicated a willingness to accept asymmetry, "whereby certain capabilities are in certain brigades and certain divisions, and then by the time they are fielded to subsequent divisions, they have changed with new software or hardware," said MacIntyre. "We really see [that] as the only way for us to get more agile in fielding new hi-tech capability."

If his call for a better way to collaborate and innovate is answered, rather than silence between when a project is launched and a request for information is released, defence companies should see more engagement and possibly greater input into the final statement of requirements. ■



Members of 34 Canadian Brigade Group on Exercise Xerus Endurci on Ste-Thérèse Island near Montreal in October 2022. Photo: MCpl Dominic Duchesne-Beaulieu



Members of 5 Canadian Mechanized Brigade Group on Exercise Unified Resolve in Valcartier in February 2023. Photo: Pte Kelly-Ann Lepage



As part of the exercise, 6 Canadian Combat Support Brigade continued an experiment on integrating enablers through a Combat Support Group. Photo: Sgt Faye Worthy

INTEGRATING ENABLERS

On Ex. Unified Resolve, experiments with a Combat Support Group have helped the Army understand how to best provide a brigade commander with niche capabilities.

By Chris Thatcher

Over the past three years, 6 Canadian Combat Support Brigade (6 CCSB) has conducted an experiment to understand how best to integrate its myriad of enablers into a manoeuvre brigade headquarters.

As the mechanized brigade ramps up its training during the build phase of the Army's Managed Readiness Plan, a Combat Support Group (CSG) has trialled different ideas for providing the brigade commander with improved access to ISTAR (intelligence, surveillance, target acquisition and reconnaissance) sensors, electronic warfare (EW), civil-military cooperation (CIMIC), psychological operations (PsyOps), and other capabilities.

Previously, a commander might have had to push multiple buttons, including reaching up to a division headquarters, to tap the expertise of an all-source intelligence cell, a small uncrewed aerial system (SUAS), medium range radar (MRR), specialty engineers, geomatics intelligence, or influence activities.

Through the CSG experiment, 6 CCSB has used the computer-assisted Unified Resolve series of exercises and Maple Resolve, a confirmation exercise of Army readiness, to test ways to better integrate those capabilities into a manoeuvre brigade headquarters and make them accessible to a commander.

Where previously many of those might have been attached to the brigade with their own points of contact — and contributed tangentially to the manoeuvre brigade planning — 6 CCSB now sought to make that expertise available through a single CSG command team and coordination centre.

For the third and final iteration of the CSG experiment, Lieutenant-Colonel Natasha Skidmore, the commanding officer of 4th Artillery Regiment (General Support), decided to stress the concept a little further, expanding the scope of the CSG team and integrating their experience directly into the brigade planning cell.

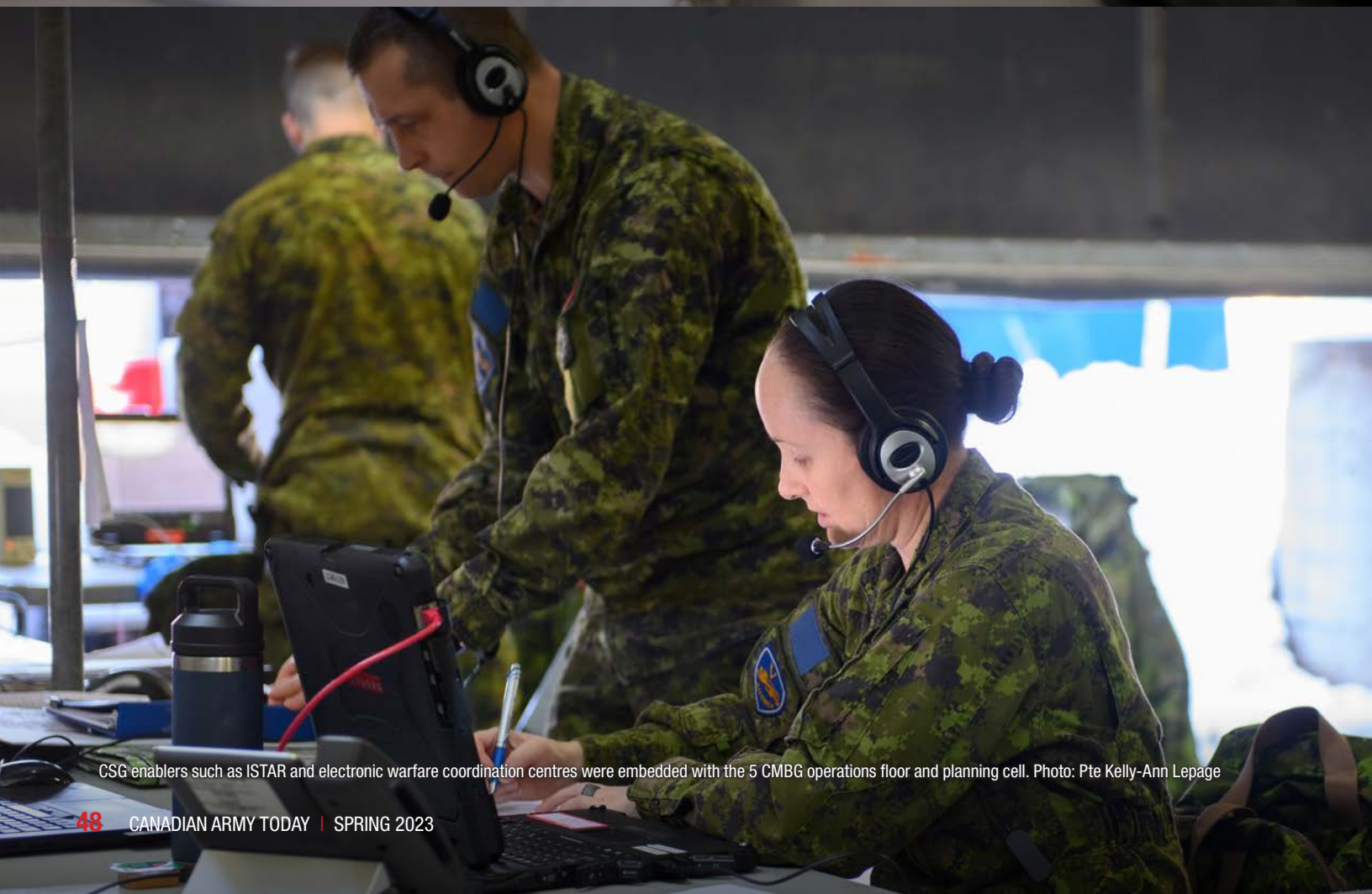
As the commanding officer of the CSG on Ex Unified Resolve 2023 (UR23) in February, she opted to “try something a little bit different.” Since the Army modernization strategy puts a premium on being innovative and adaptable, she



5 CMBG put an emphasis on integrating its informational capabilities with those of the Combat Support group. Photo: Pte Kelly-Ann Lepage



A member of 2 Canadian Mechanized Brigade Group Headquarters and Signal Squadron during Ex Unified Resolve participating from Petawawa. Photo: Cpl Aimee Rintjema



CSG enablers such as ISTAR and electronic warfare coordination centres were embedded with the 5 CMBG operations floor and planning cell. Photo: Pte Kelly-Ann Lepage

placed enablers such as the ISTAR coordination centre, EW coordination centre, influence activities and intelligence functions among the operations staff.

"We wanted to be more integral and really integrate ourselves," she explained, "so instead of having them located in the CSG headquarters, we decided to have more direct representation on the current ops floor than the past two iterations. In past iterations, [the CSG] filled a sense function. This time, we took a little more responsibility and filled their ISTAR function."

Not only did that embed ISTAR and other specialists in the brigade planning cell, it also reduced the number of liaison staff between the brigade and the CSG headquarters for the exercise, shrinking the CSG footprint considerably.

"In the past, one representative would [go back and forth] and we would build the plan at CSG headquarters," she said. "This time, we built our plan in the G5 [planning] shop with the G5. When we had to move assets, it was done on the current brigade ops floor, not back at the CSG. So, less liaison and more empowered decision-makers there that could execute plans."

In addition, the CSG's intelligence capabilities were integrated more closely than previously with other military intelligence functions in the CSG headquarters, reinforcing the intelligence capability of brigade operations, Skidmore said. Beyond helping answer the intelligence questions for the manoeuvre brigade, CSG was able to provide detailed intelligence related to its own specialist capabilities.

"How is the enemy going to target the SUAS? What exact air defence systems will they use to shoot it down? We were able to provide tailored intelligence for each of our capabilities, whether EW or the CIMIC and PsyOps teams on the ground," she explained. "I thought we had a great interplay between the deep intelligence thinking and then the close fight for information."

Unified Resolve's primary training audience, 5 Canadian Mechanized Brigade Group (5 CMBG), placed a particular emphasis on integrating its own informational capabilities and staff with those of the CSG. To ensure efforts and activities were aligned, the CSG physically positioned its PsyOps and CIMIC staff side-by-side with the brigade headquarters' integral G9 team, who focused on many of the same issues. The result was seamless coordination and noticeable improvements compared to the past two iterations of the exercise.

"That was a huge win," she said. "Often, we don't bring everybody to the fight. But when we brought in that [PsyOps and CIMIC] team, they were able to play realistically and challenge assumptions from different angles."

Skidmore, an artillery officer who has spent much of her career on the gun line and as a forward observer and joint terminal attack controller, also opted to blend the personnel of the Surveillance Target Acquisition Coordination Centre among 4th Artillery (GS) and close support artillery. The unusual step allowed junior members of both teams to learn and share information on long range sensors and close support artillery. "In the spirit of being innovative and adaptable, I thought it was a great professional development opportunity for our team," she said.

If the original intent of the CSG experiment was to provide a brigade commander with a single button to push to deliver the effects of 6 CCSB's enablers, the commander of 5 CMBG, Colonel Marie-Christine Harvey, still had "one-stop shopping" to close her sensor to shooter link, Skidmore noted. But by placing CSG expertise directly on the current ops floor and within the plans team, she ensured the right people were in position to provide advice.

"Sometimes our specialist enablers are under-ranked," she observed. "The most knowledgeable person on lightweight counter-mortar radars is often a master bombardier or a sergeant, and sometimes in a headquarters full of captains and majors, they are not heard in the way they should be. But when we specifically designate a team to look after these enablers, despite their

ranks, they are heard."

The CSG concept was tested once again in a scenario within the Decisive Action Training Environment. Set in Eastern Europe, the Canadian brigade fought alongside a Latvian brigade, driving back an invading force to the border. The scenario included a mobile defence, reconstitution, and then a counterattack to push the enemy back across the previously established international boundary. The congested ground and airspace provided a challenging mission for the brigade, and a constant test for CSG's enablers, especially its intelligence capacity and its PsyOps and CIMIC abilities in highly populated areas.

"We had a good balance of emphasizing the complexity at some of the stages of battle that we don't often practice," Skidmore said.

With the experiment now complete, the Army will sift through the additional information from the third trial to finalize a construct that can be bolted onto a brigade. The first deployment of that could be in Latvia, where the Army is preparing to augment its multinational battle group with additional resources to help scale it to brigade strength.

"We definitely saw the value of the experiment. It is absolutely influencing the future of how we employ enablers at the brigade level," Skidmore said. "I don't know what the end conclusion will be for the CSG, but I think the experiment does give us a template ... for how to attach some of these divisional and higher-level enablers at the brigade level."

One option could be an ISR company headquarters, led by a command team at the lieutenant-colonel or major level. "That reflects the doctrine of many of our allies and the direction they are going in," she noted.

The composition of 6 CCSB enablers in such a company will be dependent on the dynamics of the mission, but the experiment and latest trial of "unique lines of command" and a different approach to integration "allowed us to exercise our own adaptability and flexibility ... and to draw a bunch of conclusions about what does and does not work, and why," she said.

The 6th Brigade was formed in 2018, unifying the capabilities of the Canadian Army Intelligence Regiment, 4th Artillery Regiment (GS), 4 Engineer Support Regiment, 21 Electronic Warfare Regiment, and Influence Activities Task Force under one command. Because they are not co-located and don't often train as a brigade, the CSG experiment has been instrumental in building a common understanding and identity.

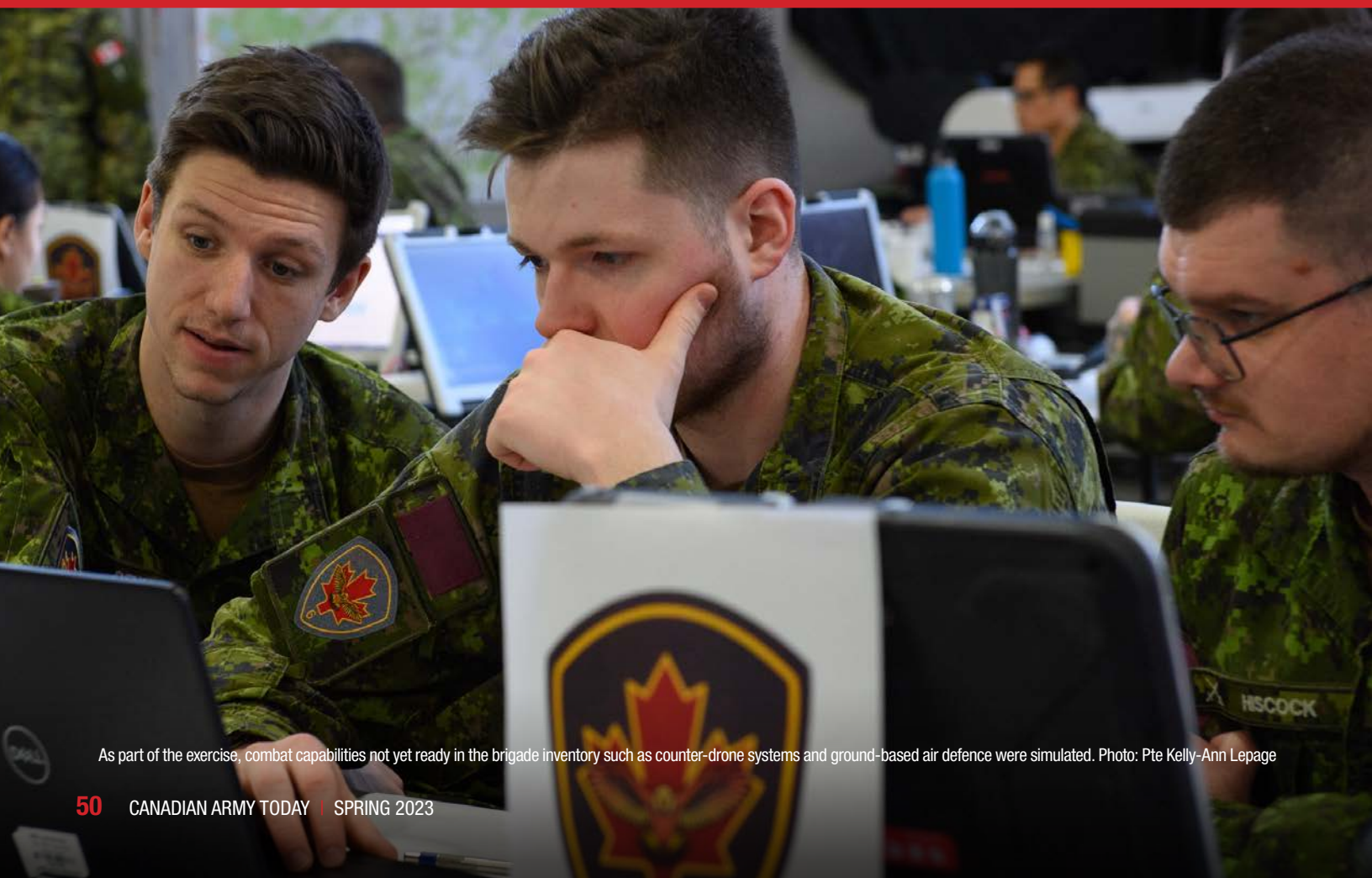
"I think this whole construct challenged how we connect and how we integrate," said Skidmore. "For all at CCSB, we learned exponentially what our partners do. We know we are a little bit alike, but we are also very different. This was a greater opportunity to understand and learn from each other."

Heavily groomed in field artillery, she was initially reluctant to transfer to the 4th Artillery Regiment (GS). But after commanding a battery there, she "fell in love" with one of the more dynamic units in the Army, which provides MRR, SUAS, and Air Space Coordination Centres, and could soon be the home of Very-Short-Range Air Defence Systems (VSHORAD) —currently being acquired as an urgent operation requirement for the mission in Latvia — and eventually Ground-Based Air Defence. "We are shaping the institution and maturing new Canadian capabilities," she observed.

ISTAR was not an area of expertise, she admitted, so she had to dig into the doctrine before assuming command of the CSG. So, she also asked the units to produce presentations for all 6 CCSB members participating in Ex Unified Resolve, to expose the team to the brigade's specialties. "It was great team building for these folks who provide niche capabilities. I've never commanded such a diverse team of specialists. This will be a career highlight for me, for sure." ■



Members of 5 Canadian Mechanized Brigade Group on Exercise Unified Resolve in Valcartier in February 2023. Photo: Pte Kelly-Ann Lepage



As part of the exercise, combat capabilities not yet ready in the brigade inventory such as counter-drone systems and ground-based air defence were simulated. Photo: Pte Kelly-Ann Lepage

ON UNIFIED RESOLVE, A FIGHT FOR LATVIA

By Ian Coutts

They didn't go where you'd think they might, they weren't totally where they really were, and they used weapons they didn't have — that was Exercise Unified Resolve 23 (UR23) in a nutshell.

It's easy to be facetious about UR23, the Army's largest computer-assisted exercise conducted from multiple locations in Valcartier, Kingston and Petawawa in early February. A key training event in the build to high readiness, the exercise prepares and validates a brigade headquarters staff and subunits for whatever operations it might be tasked to take on in the coming year, after the completion of the field exercise Maple Resolve in May.

But this year's version highlighted some of the current challenges the exercise controllers face. The scenario needs to be specific enough to test real skills, but not so specific that the lessons it teaches apply too narrowly. Looking at it, though, gives you an idea of where they think they'll be going.

They didn't go where you'd think they might.

Since last year's iteration of Unified Resolve, there has been a major change in the geopolitical landscape — the Russian invasion of Ukraine. As with many other Army exercises, the scenario is developed from the Decisive Action Training Environment to provide the political, military, economic and social factors affecting the battlespace. A few years ago, exercise planners switched the scenario from an emphasis on asymmetrical warfare of the type waged in Afghanistan, to a focus on fighting a fictitious near-peer opponent set in the Caucasus region. Last year, for the build to high readiness, the scenario was adapted for the first time to a conflict set in Eastern Europe.

Fortuitous timing, perhaps. If ever a training scenario seemed to fit the criteria for current events, this was it. Canadians, too, had experience working with the Ukrainian Armed Forces and an understanding of its capabilities thanks to a near decade-long training program for Ukrainian soldiers under Operation Unifier. For whatever reason, though, "we deliberately didn't incorporate that," said Commander Ryan Passey, the chief of training at the Canadian Army Simulation Centre (CASC).

They Weren't Totally Where You Thought They Were.

This year, the planners opted for Latvia. Or a not-quite Latvia, as it shared a border with a slightly different opponent — Donovia. In this year's scenario, 5 Canadian Mechanized Brigade Group (5 CMBG), the primary training audience along with 5^e Régiment d'artillerie légère du Canada, 5 Combat Engineer Regiment, and 5 Service Battalion, started on the defensive, then counterattacked to retake Objective Bronze (the actually Latvian city of Rēneke), and then pushed the forces of Donovia back over the border into, well, Donovia.

The arguments for basing the exercise in Latvia were more straightforward — the Army has extensive first-hand experience through the multinational enhanced Forward Presence battle group. As Colonel Scott MacGregor, head of the Canadian Manoeuvre Training Centre (CTMC) noted, "people will see themselves there."

As well, the government commitment to collaborate with allies to generate and stage the necessary forces to surge the battle group to a combat

capable brigade undoubtedly played a part. The prime minister made the announcement in June, just around the time when planning for UR23 kicked into high gear.

MacGregor emphasized that the purpose of the exercise is to prepare for "a war," not necessarily war in Eastern Europe. But the choice of Latvia, the expansion of the Army's role there, and the presence of Latvian officers on UR23, suggest that when it comes to planning, some scenarios are more plausible than others.

They used weapons they didn't have.

This year's exercise assumed capabilities — ground-based air defence, anti-drone technology, and tactical helicopters — that the Canadian Army does not own or does not have in Latvia at present. From a purely technical point of view, the Abacus software CASC uses — developed for Canada and the United Kingdom by Raytheon — allows exercise controllers to add capabilities to their simulation. "All you need to do is click a few buttons," said Vassey.

And although, in the instance of ground-based air defence, the capability has been dormant for some time, "we have a few old dogs that are able to refresh that," MacGregor pointed out.

The capability is one of three, along with portable anti-tank systems and systems to counter drones, that the government recently announced as urgent operational requirements to be fast-tracked for the battle group in Latvia as it is scaled to a brigade.

Beyond that, the assumptions of a future conflict — that the Army will be operating with allies and as part of a larger formation (in this case, role played by 1st Canadian Division Headquarters) — were all simulated in the exercise. Britain's Queen's Dragoon Guards acted as the divisional reconnaissance and elements from the U.S. Army's 10th Mountain Division fulfilled a combat helicopter role. That is one of the strengths of coalition operations, MacGregor noted — if you're working with partners, you can draw on their assets to fill certain capability gaps.

Everything Everywhere All at Once.

About 1,000 personnel were involved in Unified Resolve 23 — 500 in Valcartier with 5 CMBG, 200 in Petawawa, and the rest at CASC in Kingston, or scattered across the country. That's part of the beauty of a networked simulation like this.

While the brigade headquarters in Valcartier was staged in a large hangar on the base, pre-Covid-19 pandemic iterations of Unified Resolve have seen the brigade staff put through their paces from tents in the field, as if conducting an actual operation.

CTMC wants to expand that concept. "Over the next year we will be evolving Unified Resolve and Maple Resolve to the point where we can export them," said MacGregor. "We're looking at how to make this happen."

In future, any brigade undertaking those validation exercises could find themselves far from home. "It could be the U.S., it could be in Australia," he observed. Or even, "potentially Latvia." ■



Detecting and Defeating IEDs

By Ken Pole

Of the 159 Canadians who died during this country's decade-long combat mission in Afghanistan, the majority were victims of improvised explosive devices (IEDs). Hundreds more were wounded or otherwise traumatized.

Major Pete DesRoches, a combat engineer officer, is leading an Army program designed to reduce the probability of it ever happening again. The Advanced Improvised Explosive Device Detection and Defeat (AIEDDD) project he oversees within the Directorate of Land Requirements (DLR) is designed to minimize this type of threat by using more modern technology.

He was tasked with the job at a time when Canada, like the rest of the world, was learning how to work remotely due to the coronavirus pandemic, and quickly moved the project through critical early phases. In late February, he told *Canadian Army Today* that it is moving toward the definition phase, "probably this fall."

But it took a while for the Army to generate enough steam to get things moving. Like many other Army projects, AIEDDD went through years of concept development before being given the green light by the government's 2017 defence policy, *Strong, Secure, Engaged*.

Although an Army project, it is also developing and maintaining counter-explosive threat equipment capabilities across the Army, Navy and Air Force.

The need for a modernized approach to a pressing tactical problem was underscored in Afghanistan as the Canadian Armed Forces (CAF) initially countered Taliban tactics such as improvised explosive devices (IED) with equipment and techniques past their prime.

"IEDs basically became the signature, the weapon of choice amongst the insurgents we were up against. That became the biggest threat we had to



A member of 1 Combat Engineer Regiment performs a secondary search around an improvised explosive device in the Wainwright training area during Exercise Maple Resolve in May 2016. Photo: Sgt Jean-Francois Lauzé

combat there. Unfortunately, we weren't well-equipped to take on the task that was set for us at first. But during those first few years, we did some amazing work in restoring some capabilities as well as revitalizing the EOD (explosive ordnance disposal) training CAF-wide and institutionalizing tactics required to counter explosive threats being used as the weapon of choice.

"However, even before that, things had started to degrade through Bosnia and Kosovo," he noted. "Years of UN peacekeeping around the world and into the Balkans that focused on mine detection did not prepare us well for Afghanistan."

With Afghanistan concluded, the Army must now deal with the fact that "some of our current capabilities are dated and no longer supportable," DesRoches explained. "In many cases, the parts are simply not available to maintain some of our equipment, making it necessary for us to procure a new system."

Through the AIEDDD project, the Army is seeking to rejuvenate some capabilities while also looking to the future, with the development of new capabilities like high energy laser (HEL) systems to destroy scattered munitions from a safe distance.

"Right now," he said, "we're trying to renew our UGVs (uncrewed ground vehicles)," tracked robots with various capabilities. "We're looking at two new systems: one classed as a mini UGV as well as a replacement for our current small UGV, which is used primarily for confined spaces. The manufacturer has informed us that they are ceasing support. That's the hard truth about a lot of our equipment — we hang onto it for so long that it gets to a point where it is no longer maintainable."

"We've done mid-life upgrades to the current small UGV and [the manufacturer] told us well in advance that they're no longer going to support it. We've got to get this project done so that we can deliver something our EOD teams can work with."

Without the UGVs, EOD operators will have to turn to bomb suits, which is the last resort, he said. With newer UGV and UAS technology, "we are trying to increase the stand-off distance for operators from explosive threats to maintain their survivability."

DesRoches dismissed the prospect of autonomous UGVs for counter-explosive work for this project, suggesting the technology has not advanced that far — yet. "The UGVs that the operators use will go downrange with cameras, x-ray systems and sensors to enable us to figure out literally what makes a device tick and then how to render it safe by blowing it up or dismantling it."

The Army also is looking at small uncrewed aerial systems (UAS) that can be used to scope out the best route for an EOD operator to send a UGV to a suspected IED location or for searching a building before sending in a UGV or doing a manual approach.

Defence R&D Canada has been a key to UAS testing for the Army, DesRoches added, conducting trials which he expects will support DLR's approach to prospective suppliers when it solicits requests for proposals.

Domestic industrial input into the UAS element of the AIEDDD project, however, may be minimal. "We're leaning quite heavily on work that the U.S. has done with the Blue UAS list," DesRoches noted. The Blue list is a list of UAS classes that have been preapproved for use by the Department of Defense after going through various checks to confirm they contain no foreign technology.

"That's going to be one of the key criteria for us in getting a system," he said. "We want to ensure that we don't end up with something that's going to compromise the security of other systems." ■



A Canadian soldier explains how to use the hook and line system to open a door to a member of the French Armed Forces during Ex Ardent Defender 2022 in Gagetown in September 2022. Photo: S1 Larissa De Guzman



Canadian and American soldiers work on forensic observation skills during Ex Ardent Defender 2022. Photo: S1 Larissa De Guzman



An UGV and a combat engineer search for an IED on Ex Ardent Defender 2021. Photo: MCpl Michael MacIssac



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Light Utility Vehicle Project

By Ian Coutts

It never feels like news when the defence procurement process takes longer than expected. So, take the latest on the Light Utility Vehicle (LUV) project as a “no news, good news” situation.

The “no news” is that the initial stage of the project has taken much longer than anticipated. Back in the Fall 2019 issue, when we last profiled the program to purchase a fleet of vehicles to replace the Army’s 20-year-old Mercedes G-Wagons and Chevrolet Silverados, the project was in the options analysis stage. Which is where it remains today — nearly three years later.

The good news is that it looks as if 2023 will see the project shift gear and move forward more rapidly.

Major David Gottfried, who has served as the project director for the Directorate of Land Requirements (DLR) since 2018, says several factors were at play. Part of the reason for the delay was, as might be expected, the effects of Covid-19. The pandemic closed offices and scattered workers to their homes for the better part of two years. As well, the military has been on a bit of a procurement binge recently, creating a backlog as projects move through approval gates. “The Army alone has 39 major capital projects currently going through the system,” he said.

Finally, before the LUV program could proceed to the definition phase of the process, the cost estimate needed to be endorsed by National Defence’s cost analysts, experts who undertake all the numerical calculations required for budgeting a project. They are thorough — and few in number — creating another bottleneck.

That crucial step is now underway. Gottfried has a rough estimate for a vehicle fleet (he would not reveal how much at this point), and the project is now advancing.

The LUV project may lack the charisma of some higher profile procurements, but it is an essential piece in the Army’s vehicle fleet. While it is being steered by the Army, the final choice will affect medical services, military police, and the Air Force. Essentially, the whole of the Canadian Armed Forces except for “[Special Operations Forces], who have their own special requirements, and the Navy,” Gottfried said.

At present, there are around 2,200 G-Wagons and Silverados in the Army’s inventory that first entered service in the early 2000s. “Those numbers have probably gone down,” Gottfried noted, “[as some] are no longer available.”

His DLR team is seeking to purchase 1,500 to 1,850 militarized vehicles and about 400 civilian style trucks to take the place of the Silverado pickup trucks.

The light utility vehicles will be required to take on a wide range of roles. The Army is looking at a four-seat version for both the Regular and Reserve forces that will serve as a command platform and as a reconnaissance



Photo: Sgt JF Lauzé



A camouflaged G Wagon from 2 Service Battalion. Photo: Sgt JF Lauzé

Shifts Into A New Gear

vehicle, equipped with either built-in or bolt-on armour. The military police, both Regular and Reserve, will require a variant of the four-seater, bearing their markings and equipped with some specialized kit.

There is also a need for a two-seat militarized version capable of carrying 1,500 to 2,000 kilograms of cargo. This would plug a key logistics gap that is evident in the growth of increasingly heavier gear that smaller units now haul on operations. The militarized two-seater will be an integral part of the logistics chain, providing support to front line units. As well, the signals units will require a variant of the two-seat truck with cable-laying equipment.

Ideally, the Army would prefer to purchase a single chassis for all the LUV military variants. This has been the preferred option since the project was stood up, and relates to cost and simplicity of maintenance. But meeting the many constituency requirements with a single chassis may not be possible.

Whether one or two chassis, the Army is not distinguishing between a chassis created originally for a civilian vehicle and what is known as a standard military pattern. What does the job is what matters. Whatever vehicle is chosen as a replacement for the Silverado will, like the vehicle it replaces, be used primarily on bases or by Reserve units in an administrative capacity, rather than on operations.

Unlike some procurement projects, the LUV program will have plenty of options to choose from. Gottfried said a request for information sent out last summer netted “10 respondents — 10 different companies put in their replies. And that doesn’t mean there aren’t other companies out there,” he added. “There’s big interest in this project from a big pool of competitors.”

Whatever vehicle is chosen, it will likely have a lifespan of 20 years. “And a lot of the companies say they can do much more than that,” Gottfried noted.

For the non-militarized variant of the Silverado replacement, the DLR team will look closely at hybrid or electric options. “One of the problems we run into with the militarized pattern vehicle is that the technology isn’t there yet for 24-hour operations,” he said. “Also, we have to be interoperable with our allies who all currently operate on diesel fuel.”

Once the costing analysis is complete, the next step will be a presentation to the Program Management Board, where the whole project will be reviewed. “Does the cost make sense? Does the capability we’re asking for make sense? Can we sustain this going into the future? That’s all reviewed at that time,” Gottfried said. “That is the big step for us, and that gets us one step closer to definition. All things being equal, we should be into definition this year.” ■



A G-Wagon with the eFP Battle Group in Latvia during a wet gap crossing.
Photo: SSgt Christian Milano



Members of 31 CBG conducting reconnaissance in the Borden training area in August 2022. Photo: Cpl Aaron Beier

Taking back the night for tactical advantage

By Ken Pole

In its June 2017 defence policy, the federal government used the word “vision” a lot but mostly in a generic contemplative way. However, tucked away on page 36 was a commitment to recapitalizing an outstanding requirement for new “soldier night vision systems.”

It remains a work in progress. The Directorate of Land Requirements (DLR) had identified the need long before the policy paper was released. Now, after

years of research and experimentation, a request for proposals could be issued to industry later this year.

“But I temper that by saying that there are a lot of factors involved that are outside of DLR’s influence,” cautioned Captain Marcel Campbell, a member of the Night Vision System Modernization (NVSM) project team, a program that is also addressing Royal Canadian Navy night vision requirements.



A member of the 2nd Battalion, The Royal Canadian Regiment, looks through the night vision system of a Light Armoured Vehicle. Photo: Sgt Jean-Francois Lauzé

The Army calls the overall effort “a multi-phase hybrid project.” Phase 1 is a hand-held long-range laser range finder. Phase 2 includes the night vision goggles, laser aiming devices and hand-held medium range thermal imagers. Phase 3, involving augmented reality and thermal fusion, is further down the road.

Given the length of the project, is there a risk that technology advances will outpace the written requirements?

“We have established the high-level mandatory requirements based on outperforming an adversary,” Campbell replied, which will in part determine how far out the Army needs to see at night. That in turn will inform the statement of requirements and “give us the flexibility to increase our performance requirements as we approach industry for proposals.”

There’s no gainsaying the importance of night vision technology, which has contributed to various Army operations since the turn of the century, most notably the 2001-2014 mission in Afghanistan.

Since then, in a bid to better understand how the technology has evolved, the Army project team has worked with the infantry battalions of 2 and 5 Canadian Mechanized Brigade Groups in Petawawa and Valcartier, respectively. This “tech watch” included trials of various manufacturers’ products in collaboration with Defence R&D Canada (DRDC).

The Army’s most common night vision device is the monocular L3 Harris AN-PVS-14, last upgraded 15 years ago. For now, however, the project team isn’t about to scrap what remains an “excellent” product despite its age.

One option is to replace the image intensifier tube, which amplifies low light level images to where they can be seen by the naked eye. This would bring the AN-PVS-14 up to today’s standards in terms of performance.

Campbell confirmed that “we’re also looking into a binocular night vision device.” The binocular helmet-mounted unit offers better depth perception at close range, but “it’s a question of who specifically needs that more expensive binocular solution – it can be twice the price.”

Field of view is a critical consideration in whatever the Army procures. “The standard is still 40 degrees, but there are some binocular solutions with a slightly wider field,” said Campbell. “However, you’re sacrificing image clarity.

By offsetting the two tubes to get that wider field of view, you get a slightly blurrier picture. There are other solutions with four tubes that give you really good peripheral vision, but it’s too costly and not worthwhile for the Army to consider.”

The added weight of four tubes “isn’t worth the added advantage for what we do,” he noted.

DRDC, which has been deeply involved in the Army’s program, is tapping individual regiments for the advice of experienced personnel on how to proceed, notably about the mono-versus-binocular debate, which Campbell said has been “trialed in relatively realistic scenarios.”

Weight, too, is a concern. Adding more features to a system often means added weight, the last thing soldiers want, even if it’s a minimal increase. “The newer binocular night vision devices do have more weight than the AN-PVS-14, but the added weight is worth the increased capability,” Campbell observed.

He said there are ways to handle increased weight, including counterweights to balance the load. It may seem counterintuitive, but research has suggested that counterweights can reduce torque on a soldier’s neck by reducing the overall burden of the device.

Another critical component of soldier night vision is the ability to see at long ranges. The Army is looking at two solutions for this requirement. While both systems are built around thermal imagers, they incorporate two different technologies.

“One is a cooled device for long range. It’s a little bigger, heavier and requires more power,” Campbell explained. The medium-range uncooled device uses a different thermal channel, “so although it’s lighter, it doesn’t reach out as far” and uses different IR wavelengths.

To advance the project to where it is today, Campbell and previous project directors have kept tabs on allies’ night vision options. “We do look at what they have, and we are actually procuring relatively in line with what they’re doing,” he said. “In terms of hand-held thermal imagers, there aren’t too many manufacturers that can produce what we need, and so they sell fairly broadly throughout NATO.” ■



Ukrainian recruits practice their skills on the PVS-14 Night Vision Monocular during Op Unifier in January 2023. Photo: Cpl Eric Greico



Members of the 3rd Battalion, The Royal Canadian Regiment, on Ex Royal Gunfighter V in October 2022. Photo: Cpl Sarah Morley

Can Your Light Off-Road Vehicle Handle a .50 Cal

By Chris Thatcher

Inflation is having a deflating effect on defence procurement and the Light Forces Enhancement (LFE) project is no exception. But beyond the growing costs of manufacturing a four-wheeled, lightweight, off-road vehicle, the Army now knows it will need a more robust — and consequently, more expensive — version than originally envisioned.

Since acquiring 36 Polaris MRZR-D four-wheeled utility task vehicles and 12 trailers as part of a “buy-and-try” in 2017 and 2018, the Army’s three light infantry battalions have put the platforms through a range of operational scenarios and provided the LFE protect team with plenty of feedback about what will ultimately be required to be effective on operations.

The battalions have in general given the capability favourable reviews. The MRZR-Ds have proven the Army’s concept of getting soldiers and gear to a target more quickly and in better condition than if they had hiked in on foot. But the off-road tests revealed the need for a sturdier platform to navigate obstacle crossings in wetlands, forests, and other difficult terrain.

That robust requirement was confirmed again this past fall during a weapons trial. Members of the 3rd Battalion, The Royal Canadian Regiment (3

RCR), conducted a static range test with a mounted .50 calibre heavy machine gun, a 40 mm grenade launcher, and a BGM-71 TOW (Tube-launched, Optically-tracked, Wire-guided) heavy anti-tank missile.

While the grenade launcher performed well, the TOW required some additional manoeuvring to adjust the weapon’s angle for the shot, restricting the shooter to a 30- to 45-degree field of fire while standing in the cargo area. And because the vehicle’s suspension could not keep pace with the .50 calibre gun’s recoil, the weapon had to be fired at a slow rate.

“You will have one bullet on target and one bullet way low or way high, so the shooter, to ensure the suspension does not move a lot, had to go almost single shot by single shot. And that doesn’t make sense for that kind of weapon system,” said Major Samir Khelil, project director with the Directorate of Land Requirements (DLR), who observed the weapons range tests.

“That led us to confirm that we need a turret in the vehicle to be able to cover 360 degrees, so the shooter can be standing and have a proper position to sustain a few minutes of firing. If you are not comfortable behind the optics, you will probably just squeeze the trigger just to squeeze the trigger.”

Trials by 3 RCR and the Army’s other two light battalions with the Royal 22nd Regiment and the Princess Patricia’s Canadian Light Infantry have also demonstrated that the payload capacity must be larger to transport enough weapons, ammunition, personal equipment, water and rations to sustain a unit well beyond 72 hours. Previously, the project had requested carrying capacity for a maximum of three days.

“The future concept for the light forces — for those light companies or battalions or combat teams — requires that they be self-sufficient operating in different environments,” Khelil explained.

The battalion plans to continue trials with the tactical mobility platforms (TMP), incorporating the MRZR-Ds into a spring exercise to further test concepts of operation, but the DLR team is now ready to engage again with manufacturers to gather fresh data on vehicle cost.

The need for a more robust frame and the effects of inflation could mean a smaller initial buy, acknowledged Khelil, an infantry officer with the Royal 22nd Regiment, with domestic and international operational experience. The project will be seeking better data on market conditions through a request for information (RFI) to be issued in the next few months.

The Army had yet to settle on final quantities but had projected a buy of up to 300 TMPs in two variants — personnel and cargo — to equip the three light infantry battalions, the light engineer squadrons, and the light artillery tactical groups.





The 40mm automatic grenade launching system. Photo: DND



A .50 calibre heavy machine gun mounted on a Polaris MRZR-D. Photo: DND

Depending on the feedback from the RFI, the project team is now estimating around 90 tactical vehicles, still in the same two variants, plus nine to 10 trailers. The majority, around 60, would be in the troop-carrying variant.

“We are focusing right now on the core capability of the light forces,” Khelil explained. That would mean equipping one light force battle group, which includes a light infantry battalion, a light engineer squadron, and a light artillery battery.

“That’s the minimum scope,” he added. “A middle scope would increase the amount up to 330 vehicles, to equip the three light battalions. The full scope would add around 200 more vehicles to equip Reserve units, including specialists such as pioneers and direct fire support. The Reserve units are one of the main players that will need to use the TMP. But, at this time, we are focused on the minimum scope.”

In previous interviews on the LFE project, the Army emphasized a desire to be “fast followers”

and focus on platforms already proven with allied armies. But past project directors also stressed a cost-effective solution and warned of the likely need for a reality check, given the price tag of some off-road platforms — as high as \$350,000 per vehicle, they noted — and the project budget of between \$50 million and \$99 million.

While the project does not specifically call for “green” investment, “we are keeping a door open in our statement of requirements (SOR) regarding green energy,” Khelil said. The advantage of a vehicle that can run almost silent, especially at night, to get soldiers closer to an objective is obvious. But although commercial battery-powered platforms are more common, the technology might not be ready for operations, he said. “In my personal and professional opinion, we are not there yet.”

Light units operate in cold conditions, which can rapidly diminish battery life. And repairing battery-enabled platforms in the field might be a challenge

for small combat teams.

“We will observe where the technology is going,” he said, “and have an open door in our SOR for the vehicle to be able to accept that technology in a future modification. We want to have the maximum flexibility possible, so we’ll seek an option to be able to modify the vehicle rather than have to run a new project.”

Like many other projects in DLR, the pandemic delayed LFE progress. The Army had anticipated reaching initially operating capability (IOC) with one of the light battalions by 2025. Khelil said the project will now likely go out for tender by the end of 2024 or early 2025, and achieve IOC in 2028.

“The [light battalions] did a great job with the trials, and it’s now our duty to provide them with a vehicle that is capable and that the troops on the ground trust to accomplish their mission,” he said.

The LFE project is part of a broader effort identified in the government’s 2017 defence policy to purpose-build and equip the light battalions. ■



Photo: MCpl Malcolm Byers



Members of 31 and 32 Canadian Brigade Groups on the Infantry Dismounted Company Commander's Course in August 2022. Photo: Pte Dominic Sobotka

RECONSTITUTING THE FORCE

Facing a workforce crisis, the military is starting to see positive effects from a multi-pronged plan to recruit and retain talent.

By Lisa Gordon



A student on the Infantry Platoon Commander program participates in ice breaking training in Gagetown in January 2023. Photo: Cpl Morgan LeBlanc

Last fall, Chief of the Defence Staff General Wayne Eyre acknowledged that the Canadian military is facing a workforce crisis. In a directive issued on Oct. 6, 2022, he said significant work must be done to “overcome deficiencies that are hampering the composition and readiness of the Canadian Armed Forces (CAF).”

Changing demographics, the aftermath of the Covid-19 pandemic, and “unhealthy attrition” are some of the factors influencing the CAF’s ability to promote and defend Canada’s interests — at home and abroad.

In his directive for CAF Reconstitution, Eyre said efforts to recover and rebuild the Canadian Army, Royal Canadian Navy and Royal Canadian Air Force will focus on three priorities: people, operations, and modernization. He ordered that all non-essential tasks, ceremonies and other events be cancelled or minimized in order to prioritize reconstitution efforts.

What do these reconstitution efforts look like, and what progress is being made? *Canadian Army Today* spoke with two senior officers, Major-General Lise Bourgon, Acting Commander, Military Personnel Command, and Brigadier-General Krista Brodie, Commander of Military Personnel Generation Group, about member retention and recruitment – two crucial aspects of returning the CAF to full strength.

RETENTION: NO SILVER SOLUTION

The 2022 CAF Retention Strategy, also issued on Oct. 6, 2022, aims to improve the military experience for all members in the Regular Force and Reserve Force. Initiatives will focus on enhancing personal well-being and improving workplace culture and work-life balance. Taken together, these programs aim to retain CAF members who take their unique skills, knowledge and training with them when they choose to leave military service before reaching compulsory retirement age.

Across the CAF, the average rate of attrition (Regular Force and Primary Reserve) is generally between eight and nine percent. This is the lowest attrition in the Five Eyes intelligence alliance (where Canada’s partners include Australia, New Zealand, the United States and the U.K.), but it is still concerning.

The CAF says its desired strength level is 71,500 Regular Force members and 30,000 average paid strength (APS) for the Primary Reserve. That would allow the forces to deliver and sustain concurrent operations in keeping with government priorities and objectives, both domestically and internationally. However, the Regular Force and Primary Reserve are currently well under these desired strength levels. The Regular Force has 63,453 members (a decrease



A master corporal from the 2nd Canadian Artillery Regiment during Exercise Noble Guerrier in Valcartier in January 2023. Photo: Cpl Valérie Duclos-Péloquin

from 65,024 at the beginning of this fiscal year), while the Primary Reserve sits at an APS of 22,047 (a decrease from 22,799 at the beginning of the fiscal year).

While accepting that natural attrition is unavoidable as members retire to make way for the next generation, CAF leaders are particularly focused on reducing what is called “unhealthy attrition.”

“Unhealthy attrition, which is really the target of the retention strategy, is looking at these people that leave before completing basic training,” explained Bourgon. “They leave before reaching the operationally functional point where they’re employable.”

In addition, unhealthy attrition includes more prevalent departures in certain employment equity groups, or within specific occupations and trades where people are leaving at a higher rate than elsewhere.

Bourgon said the overall CAF attrition rate of eight to nine percent can be further divided into medical releases and “unhealthy” voluntary releases — although those categories are not mutually exclusive. Over time, the CAF’s new exit surveys will offer more information related to the experiences of CAF members and the factors influencing retention. Currently, attrition numbers are not available specifically for the Army.

“Members leave for different reasons,” she continued. “We do surveys regularly to get information on why people leave the CAF. . . My gut feeling from all the town halls I’ve done in the last year is that the reasons people

leave are agnostic to the uniform that they wear.”

The most recent surveys pointed to job and pay dissatisfaction, linked back to the post-pandemic increased cost of living. But other than a non-specific desire for change, the biggest reason CAF members give for leaving is the impact of the military lifestyle on their spouse and children.

“There is a desire for a bit more stability and control of where they get sent and employed. So, those are the biggest reasons that we are tracking.”

While she acknowledged there is no one magic solution to fix the retention issues, the CAF must truly understand why people leave the service to then implement solutions to address those pain points, Bourgon said. Key to that effort will be new exit surveys designed to identify exactly what is prompting members to depart.

“If you tell me that you’re leaving for family reasons, that doesn’t give me enough to go and push for different programs,” she explained. “If I hear the majority of men and women saying, ‘I am leaving the CAF because I don’t have access to daycare,’ as an example, then we can go back to the government and say, ‘People are leaving because they don’t have access to daycare. Therefore, daycare is super important. We need to do something about this.’”

Bourgon acknowledged that it’s currently an employee market, and the CAF is facing competition from the civilian world, which may offer higher pay. She believes one of the ways to counter this threat is by better communicating the



A member of 33 Canadian Brigade Group watches his arcs following a landing in a CH-147F Chinook during Ex Stalwart Wolf in Petawawa in August 2022. Photo: S1 Anne-Marie Brisson

“CAF Offer” – in other words, that being a member is about more than getting a paycheque.

“It’s key for everyone to understand that being a CAF member is about more than getting a salary deposited into your bank account . . . there is also the non-monetary aspect of being a CAF member: the pension plan, the access to the gym, the leave, all the education and the training, the uniform, the esprit and the camaraderie.

“We forget about the rest of the package, the total reward that we get in the CAF . . . that is so incredible and we have to measure that value proposition. People need to be aware of that package, so they completely understand what they’re getting at the end of the month.”

In addition to better communicating what the CAF can offer, Bourgon said the retention strategy includes placing good leaders in the chain of command.

“People don’t leave the military because of a specific problem. They usually leave because it’s the last drop. [They feel] that their leadership, their chain of command, is not getting involved, is not supporting them.”

As part of its culture evolution, the CAF is placing an emphasis on inclusion initiatives and will be training and selecting leaders who can walk that talk.

“People need to feel valued, appreciated, cared for – that’s for everyone, that feeling of belonging . . . how we select and how we evaluate our leaders is very, very important,” she said.

The CAF Retention Strategy is part of a larger multi-pronged approach designed to attract more people to military service. In 2022, for example, the CAF updated its dress code to be more inclusive by allowing members to have longer hair, beards and tattoos, among other changes.

Bourgon said Canada’s Five Eyes allies are watching the dress code changes closely to see if it will make a positive difference in recruitment and retention. She said international programs have also inspired Canadian initiatives, including the CAF Offer. “Again, [it’s about] feeling valued and being who you are, and being able to be who you are in uniform.”

When it comes to retaining CAF members, Bourgon said that at the end of the day, positive progress can be measured in improved morale, greater trust in the institution, and a reduction in unhealthy attrition.

“I would say that the troops are going to tell us if we’re making progress,” she concluded. “Normally, they’re not shy to tell us what we need to change. So, it’s about listening to them and trying to execute on their dissatisfiers.”

RECRUITMENT: CAUTIOUSLY OPTIMISTIC

The CAF Common Operating Picture is a report that tracks a wide variety of monthly statistics, including member intakes/releases, recruiting and training levels, occupations with critical staffing issues, and reconstitution plans.

Numbers from Dec. 31, 2022, reveal that the total strength of the CAF’s



A sniper during Ex Iron Sword at the General Silvestras Žukausas Training Area in Pabradė, Lithuania in November 2015. Photo: Cpl Nathan Moulton

Regular Force was 63,453 members. That's 8,089 short of the total establishment number (71,542) authorized by the government and Treasury Board Secretariat in terms of positions and pay. What's more, that shortfall has been growing steadily since 2020.

Along with retention, recruiting plays a critical role in meeting the CAF's broader reconstitution goals.

"In any given year, our Horizon 1 Strategic Intake goal will rest somewhere between 6,300 and 6,800," explained Brodie.

"We know that for 2022-23, our goal was just over the 6,300 threshold. But, we knew right off the bat at this time last year, before we even started, that we were not going to be able to achieve that. We have a really good appreciation of what our capacity is from a recruiting and training perspective . . . the barrier this year was recruiting capacity and so our goal was set at 5,900 . . . even knowing that what we really needed was 6,300 [to satisfy reconstitution numbers]."

Brodie said the Covid-19 pandemic had a massive impact on the CAF's training capabilities.

"We went through a couple of years where we had the capacity to process and bring in more than we could actually train. That paradigm shifted this year; all of a sudden, our governor is recruiting capacity, that initial onboarding capacity."

As of late January, Brodie said the CAF had reached 55 percent of its in-year strategic intake goal, with just over 3,200 of the 5,900 enrolled. She said that when fourth quarter capacity is considered, the CAF expectation (as of Feb. 17) is that it will achieve 67 percent of its intake, or 4,000 members.

It's been a dynamic time, with record recruitment in the fourth quarter of last year, represented by January to March 2022. The CAF enrolled 1,000 members in January 2022 alone — numbers not seen since the height of the Afghanistan mobilization. But Brodie said that came at a cost: any qualified applicants waiting for an offer received one, and the recruit wait list was depleted. This has caused the CAF to quite literally recruit off the street in real time to meet training starts.

"It became very clear within the first several weeks of the new production year and certainly by the end of April (2022) . . . that we were in an applicant crisis," she said.

The CAF responded by increasing its advertising and being more present at targeted community attractions and activities, elevating Canadians' awareness about military careers. By October 2022, applicant numbers were starting to trend in the right direction. On Nov. 1, the CAF "opened the aperture" further by accepting applications from Permanent Residents, and by the end of the month, the forces had received more than 6,000 applications. Brodie said the positive trend continued into December and January.



Members of the 2nd Battalion, Royal 22^e Régiment, rope from a CH-146 Griffon in the Valcartier training area in January 2023. Photo: MCpl Nédia Coutinho

“There is scope for us to be cautiously optimistic that many of these micro improvements that we’re accruing are having a positive impact,” she said.

Within the Army, it’s the technical trades that are suffering the most in terms of personnel shortages. These include occupations in the communications and signals space as well as vehicle technicians.

Brodie said that having those technical domains fully staffed is key to being operationally effective in a digitally-enabled battlefield. She said targeted recruiting will focus on communicating the CAF value proposition to “places where people have and are studying for and demonstrating interest in those fields.”

Broadly speaking, the CAF intends to dial up awareness about its career options, which extend far beyond traditional combat positions. It is also streamlining the application process thanks to the implementation of new digital architecture, and speeding up medical approvals for applicants who do not require further examination. Security checks for 85 percent of Canadian citizen files are going through within 14 days, while onboarding time for permanent residents is slower.

Brodie said from a culture standpoint, the CAF is a large and complex organization of more than 100,000 people. It has committed to holding itself publicly accountable for tearing down archaic biases and adopting a more open and welcoming culture — one that allows people to be

themselves as they serve.

Word of mouth is by far the most effective CAF recruitment tool, and Brodie said current or former members serve a valuable role when they act as CAF ambassadors. The Canadian Forces Recruiting Group has launched a resource that provides information for CAF members to pass along to interested members of the public. Social media also plays a huge role in keeping the military top of mind with Canadians.

Brodie summed up the plan to reconstitute the CAF: “To return to full strength we must attract suitable applicants in sufficient numbers; onboard them through an optimized experience from a human and digital perspective; and provide a training experience that optimizes their potential to perform in their designated occupation, so they feel they are valued members of the organization — and we need to do that over and over again at scale.”

In a world where threats are evolving and the operational environment is always changing, CAF reconstitution will not be a short-term undertaking.

As various retention and recruitment efforts begin to converge, the military hopes to see member satisfaction rise while unhealthy attrition declines, as new applicants come forward to renew the CAF’s fighting spirit. ■



Civil Assistance

Faced with the impact of a major blizzard, Domestic Response Companies planned how to support local communities.

Story by Ian Coutts / Photos by MCpl Justin Roy

The weather cooperated for Exercise Trillium Response. The goal of the early March weekend-long training event at Toronto's Denison Armouries was to put Domestic Response Company (DRC) personnel, drawn from 31, 32 and 33 Canadian Brigade Groups, through a planning exercise where they were called on to help civil authorities in towns across Ontario after a massive blizzard walloped the province.

So, the 20 centimetres or so of snow dumped on Toronto overnight was a visible reminder that, yes, winter weather events can be disruptive — as anyone walking from the parking lot to the armoury in street shoes quickly found out.

Given that the role of a provincial response system was being played out in what felt like a high school gymnasium, with trestle tables featuring hand-lettered signs serving as local Emergency Operations Centres (EOC) of snow-bound municipalities, the late winter snowfall probably helped the 50 or so Reserve members get their heads into the game, so to speak.

Trillium Response historically has been an annual event. Thanks to Covid-19, this was the first time it has been held in a few years.

The 4th Canadian Division exercise is a follow-on from Trillium Dragon, held in the fall. In that event, staff of the three brigades' Territorial Battalion Groups laid the groundwork for the Reserve response to a request for assistance in the aftermath of a major ice storm. (In fact, the exercise scenario drew heavily on the experience of the 1997-98 ice storm in Eastern Ontario and Western Quebec.)

Now, on this winter weekend, it's the turn of the Domestic Response Companies to put some flesh on those bones and work out more of the *how* to their response.

Each brigade has a town that they'll be working with, Carleton Place for 31 Brigade, Bolton for 32 Brigade, and Leamington — Ontario's tomato capitol — for 33 Brigade. Those EOCs in the gymnasium are staffed by Calian employees, who are playing the part of local emergency responders. Two soldiers from each DRC are "embedded" in their respective EOC, working with them, relaying information and requests back to their DRCs.

Major Chris Wattie, the 4th Division's J 35 and head planner for this year's



version of Trillium Response, has a message for the participants: “No plan survives contact with the civilian environment.”

The point he is making is that in an emergency like this, they’d better get used to the ground shifting under them — a lot. The civilians that reservists are there to help will tell soldiers what they need, whether it’s bodies to run a warming centre or food and water brought in. By the same token, the military needs to ensure the people they are helping understand “that we aren’t in charge.”

“We can do things to a certain point,” Wattie says, “but after that they’ll have to take over.”

There are actions that the military simply can’t undertake. As an example, he says, whatever people might think, “we can’t do law enforcement.” The liaison officers who will be working with civilians in an emergency need to understand this, too.

Plunk in the centre of the gym is a group of Calian employees seated at laptops — the exercise controllers. As they click away, a steady stream of

what look like social media feeds flash on large screens set in front of them. These are the “injects,” those vexatious details that DRC liaison offices working at the local EOC offices have to be aware of (they’re seeing them on their laptops), and then confer with their civilian counterparts to determine whether it’s worth notifying their higher commands. These injects could be official communiques from the police or local government, news reports or, appropriate for today or for a major weather event unfolding in real time, hash-tagged tweets or Instagram posts reporting a road closed or a downed powerline.

Over at the Carleton Place EOC, Captain Al McLean of the Ontario Regiment, one of two liaison officers assigned to it, explains how this works. Exercise control has sent out a news announcement from Hydro One, that they are currently slow in getting the power restored. Seeing this, he asks the local EOC people, “Well, what do you want us to do?”

“We could,” McLean says, “do wellness checks,” visiting homes in isolated areas or without power to see how people are doing. “Or we can mark where trees or lines are down.”



Again, there are limits to what the military can do. For example, they can't simply send out soldiers with chainsaws to start cutting up trees. "Hydro," he says, "has subcontractors for that, and all those sorts of resources have to be used up before we can help out."

After consulting, he'd typically pass on a message to the DRC headquarters — normally by phone, but since they are located just outside the gym, by foot. In this case, this latest Hydro One report doesn't really add any new information, so he doesn't send anything on.

The headquarters for 32 Brigade's DRC is in a classroom nearby. More than a dozen people are stuffed into it, and after several hours of the exercise, the atmosphere is hot and stale. As befits a room normally used for computer training, there are plenty of big screens in rows of desks, but most of the staff in the room are gathered around a paper map with a sheet of clear plastic over it set up on a table.

One of the injects that they have received from their liaison officers is information that the road they expected to use to bring their personnel into Bolton has been closed due to the blizzard. Their job, working under Captain

Edward Gorham of the 48th Highlanders, is to find an alternate route that bypasses the problem but can still handle their support equipment. After a fair amount of discussion, they find an alternative that doesn't force them too far out of their way.

Their entire day has been like this — a stream of disruptive events. Find a route, find a location for a potential warming centre, sort out who can do wellness checks. But from this process, they have created a plan that will get the soldiers into the town and give them jobs to do once they get there.

By the end of a very long Saturday, the three Domestic Response Companies have met the various challenges that have been tossed at them, says Wattie. Sunday, the final day, will be given over largely to feedback. Next fall, the lessons they've learned here will be put to the test with a boots-on-the-ground exercise.

Much of the day has been a scramble and, admits Wattie, they hadn't really worked out what he terms "bathrooms and bullets" questions — where they would stay and what they would survive on for a longer disaster. But overall, it has been a success. "They had a plan," he says, "for when their troops arrived and what they're going to be doing." ■



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Human Interoperability

ABCANZ researchers have developed the first ever tool to measure Army interoperability in the human domain.

by Anthony Seaboyer, Mike Rostek, Nancy Teeple, Ali Dizboni, and Yazan Qasrawi



Then Major Simon Côté, Land Task Force Commander, formulates attack plans with then 1st Lieutenant McKennan, American allied troop leader, for the final assault during Exercise Allied Spirit II at the Joint Multinational Readiness Center in Hohenfels, Germany, in August 2015. Photo: Cpl Nathan Moulton



Members of the ABCANZ conference at Fort Frontenac in Kingston in December 2022. Photos: DND

Military strategy increasingly relies on multinational alliances and coalitions to broaden capabilities, increase legitimacy, and deter conflict. Multinational interoperability is therefore critical to military effectiveness. Thus, the American, British, Canadian, Australian, and New Zealand (ABCANZ) Armies Program (AAP) has committed to achieving integrated interoperability by the year 2027.

In support of this effort, the Canadian Army Land Warfare Centre (CALWC) hosted the ABCANZ Biennial Event 2022 (BA 22) from December 6 to 8, 2022, the culmination of a year-long research project on interoperability in the human domain. The research conducted in support of BA 22 was a collaboration of over 40 subject matter experts from the ABCANZ nations.

Interoperability can be viewed across three broad pillars: technical, procedural, and human. The AAP's means to measure interoperability within the human pillar is nascent. This prevents the identification of human interoperability gaps, as well as any ability to assess meaningfully and systematically the level of interoperability across this vital pillar.

BA 22 aimed to enhance the ability of the AAP to assess the human domain of interoperability among ABCANZ armies based on an agreed upon common lexicon, a deeper understanding of the aspects of the human pillar of interoperability, and the design of a measurement tool for assessing human interoperability.

The research team identified that the U.S. Army Interoperability Measurement System (AIMS) is the only interoperability measurement tool currently in use by allied militaries. AIMS is a tool designed to support U.S. Army interoperability objectives and planning. The goal of AIMS is to provide an objective measure of interoperability levels between the U.S. and a multinational partner or multiple partners.

The AIMS tool is designed to function with a variety of data input methods to meet the needs of the collection team. It is used to measure interoperability at the brigade level and above.

While AIMS reflects significant progress in assessing technical and procedural interoperability, human interoperability remains far less clearly conceptualized and not measured to the extent of the other domains. With the official adoption of AIMS by ABCANZ, the AAP has now advanced a common tool to assess interoperability.

Adapting existing measures of relevant constructs, the ABCANZ BA22 research team developed the first ever independently-developed tool designed to measure human interoperability among ABCANZ Armies: the Human Domain of Interoperability Survey (HDIS). The HDIS systematically assesses human interoperability in multinational (MN) exercises, taking inspiration from tools already tested in an army context by measuring indicators of human interoperability.

To design HDIS, the research team identified indicators of, and potential obstacles to, human interoperability, with a focus on the role of trust and culture. Trust, culture, and the quality of interactions were selected as the concepts that are most relevant to the ABCANZ community because they are key determinants of interoperability in any coalition or alliance and are at the same time operationalizable for the measurement of interoperability in the human domain.

The HDIS is designed to elicit responses regarding individual experiences, perceptions, and expectations of human interactions in a MN military environment, in order to inform a wider and deeper understanding of interoperability between MN partners. HDIS is designed to be compatible with AIMS, to enable its integration within AIMS in the future if required.

The HDIS was very well received by ABCANZ, particularly regarding how the methodological approach links the moral and ethical spheres of armies to the fighting power construct as well as operational outcomes.

The HDIS's potential has generated interest within NATO, as it may be tailored to study interoperability within other alliances and coalitions' armies, as well as air and maritime forces.

In addition to the positive outcomes of the ABCANZ BA22 project, the research team made the recommendations that research should explore more precisely how to distinguish levels of human interoperability.

While the research team proposed definitions for human interoperability that are aligned with the existing levels of interoperability (not interoperable, deconflicted, compatible, and integrated), more research is needed to refine and operationalize the existing categories. Further research should also examine interrelationships among different domains of interoperability (human, procedural, and technical). ■

Anthony Seaboyer and Dr. Ali Ghanbarpour-Dizboni are with the Royal Military College of Canada, Dr. Michael Rostek is with Defence Research and Development Canada's (DRDC) Toronto Research Centre, and Dr. Yazan Qasrawi and Dr. Nancy Teeple are with DRDC's Centre for Operational Research and Analysis (CORA).

(Other subject experts on the project included Dr. Katherine Banko from DRDC CORA, Dr. Angela Febraro and Dr. Megan Thompson from DRDC Toronto, Dr. Irina Goldenberg from Director General Military Personnel Research and Analysis, Dr. Allison Abbe, Professor of Organizational Studies at the U.S. Army War College, Dr. Kerry Foshier, Director of Research, Marine Corps University, Quantico, Virginia, and Erica Dill-Russell from the Defence Technology Agency Operations Analysis Section, NZDF. Active military expertise was provided by LTC Darren Woods (UK, ABCANZ Program Office), LTC Dale T. Verran (US, Chief Unified Action Partner (UAP) Interoperability), LCol Ted Underhill (CDN, Interoperability Co-ordinator, CALWC), Maj Nick Hammond (UK, SO2 Interoperability) and Maj Sean McDonough (CDN, SO Interoperability, CALWC).)



Photo: Dan Rogall

A Green Light For Utility Vehicles?

The future of transportation might be electric, but it's doubtful the Army's next tactical vehicles will be — at least initially. The project directors for light utility and off-road vehicles both acknowledge the attraction of electric or hybrid platforms, but they contend the technology has not reached the stage to support around-the-clock operations and coalition interoperability.

The Light Utility Vehicle (LUV) project, however, represents an opportunity to experiment. The project will replace the Army's fleets of Mercedes G-Wagon and Chevy Silverado jeeps and trucks with around 1,500 to 1,850 militarized vehicles and as many as 400 commercial style trucks.

The requirements for the militarized platform will include an internal combustion engine. But the project team has said it will look closely at electric and hybrid options for the 400 commercial trucks. Since these vehicles are used primarily on bases, on ranges, and by Reserve units, they are less likely — hopefully — to run 24/7 and require maintenance in the field.

So, would it make sense to capitalize on where the industry is heading and go green?

As one of the incumbents on the project, GM Defense will propose a militarized platform, with an internal combustion engine, based on the highly successful Silverado. But it will also provide a pathway to an electric future.

"Our goal is to make sure we architect in a path for more electric, more autonomous, and more connected capability," said Steve DuMont, president of GM Defense.

When the company was awarded the U.S.

Army's infantry squad vehicle (ISV) contract in 2020, based on the Chevrolet Colorado ZR2, it also developed an all-electric prototype of the ISV to showcase its Ultium battery technology. It has taken the vehicle on tour to give soldiers an electric experience.

The LUV project is primarily about delivering a platform to support command and reconnaissance elements on operations, but "it has a lot of hooks in the language around it" to consider electric battery or other fuel cell technology, DuMont noted.

"Canada wants to lean forward and develop a very advanced capability. And it wants to do it leveraging significant commercial investments in this space," he said. "Just like we did with the U.S. Army, we want to take that larger platform ... and build it into a great vehicle for Canada's defence needs."

The Army's Silverado was originally acquired in 2001 to replace the Bombardier-built Iltis jeeps used on bases and by specialized units, while the G-Wagon was acquired in 2003 to replace the Iltis on operations. The LUV project is seeking, ideally, a common chassis in two variants, with weapon mounts, and the ability to up-armour.

Since he became president of GM Defense in the spring of 2021, DuMont has spent a fair bit of time studying how to take the commercial technology that is underpinning the company's transformation to electric, autonomous and connected vehicles, and "adapt it in a smart way to meet our government and defence customer needs," he said. "How do we make this transformation in a smart way to harness those tactical benefits?"

As a former attack helicopter pilot used to targeting platforms using their heat signature, he noted the obvious tactical advantage of a vehicle without a hot engine or hot exhaust, and one that can ingress into a tactical situation with a quiet motor.

Military missions represent a more challenging environment than what the average GM customer needs, but there will be a strong push to move the military in a "green" direction, because the supply chain behind the platforms is also moving that way.

"This is a stepped transition to a more electric future," DuMont suggested.

GM Defense aims to be a "mobility capability disruptor," introducing and continuously refreshing technology in a manner that is much faster than current procurement systems allow. "Our whole mindset is to go fast...[and] do it in a way that doesn't require defence departments to invest their own money in the development of technology, but rather leverage commercial investment," he explained. For example, "I see autonomy as a great technology that GM is pioneering in commercial space [that can be adapted] to operate in a more austere environment."

In that vein, GM has joined Lockheed Martin to design the next lunar mobility vehicle for NASA's Artemis program, a two-seat rover that is fully electric and has autonomous drive capability.

Autonomous pickup trucks might be a step beyond what the Army needs today, but the LUV project is an example of how a commercial platform can be "adaptively engineered" to prepare for the technology of tomorrow. ■



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