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ARMY TRAINING INTEGRATION:
LAND VEHICLE CREW TRAINING SYSTEM

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**ARMY TRAINING INTEGRATION:
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TRAINING INTEGRATION: LAND VEHICLE CREW TRAINING SYSTEM

AIM

1.   Given the forthcoming investment from the Canadian Army (CA) into the Land

Vehicle Crew Training System (LVCTS) as a transformational virtual training system,

there is a need to determine how best to incorporate this system into the CA training

environment. To that end, the aim of this paper is to analyze and provide general

recommendations on how the LVCTS can be most effectively integrated into both

individual (IT) and collective training (CT) within the CA.

INTRODUCTION

2.   The current CA simulation environment represents a mix of disparate systems

each optimized towards different levels of training that generally do not operate

effectively with each other, if at all. This means that virtual training is for the most part,

limited to a single level and the ability to conduct virtual training across multiple levels

concurrently is extremely limited. This current reality is recognized in Training for Land

Operations, which acknowledges that current virtual simulation rests largely with the

level 1-2 range (individual and crew/section levels).[1] IT is supported through systems like

the Small Arms Trainer (SAT) and the various gunnery-training simulators for 120mm,

25mm and 40mm weapon systems. These are effectively stand-alone systems that cannot

be networked together. Level 3 (Platoon/Troop), level 4 (Squadron/Company), and level

5 (combat team) virtual training, if done at all, is conducted using the Virtual Battle

Space (VBS) and the Joint Conflict and Tactical Simulation System (JCATS) although

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[1] Department of National Defence, B-GL-300-008-FP-001, *Training for Land Operations* (Ottawa: DND Canada, 2014), 197.

there are limitations to both these systems. VBS does not provide a realistic vehicle environment for crew training and JCATs, primarily targeted towards Battle Group (Level 6) and Brigade (Level 7) training is only effective for simulating key command positions within the level 3-5 range.

3.   As outlined in the Government of Canada's solicitation documents, the LVCTS is envisioned to provide a realistic virtual training environment for the crews of the principal armoured vehicles currently in use by the CA to include the following: the Light Armoured Vehicle (LAV) 6.0, Leopard 2 Main Battle Tank (MBT), and the Tactical Armoured Patrol Vehicle (TAPV).[2] Once fielded, LVCTS will have a final operating capability (FOC) through facilities established at five principal army bases: CFB Gagetown, Petawawa, Shilo, Edmonton and Valcartier.[3] While each LVCTS location will be capable of supporting a doctrinal square combat team, including echelon, as its largest trainable elements, the LVCTS is intended to support a wide variety of training to include a single major exercise, concurrent multiple lower-level training events, and mixed use individual and collective training. The simulators will consist of high fidelity reproductions of the crew stations of the aforementioned combat vehicles in order to allow vehicle crews to train in a realistic fashion. The overarching system will provide a dynamic, cause and effect based simulation of terrain, weather, enemy, and friendly vehicle capabilities.[4] While the project is currently in the bid solicitation stage, the LVCTS concept represents a significant advance in CA simulation capability that can

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[2] Public Works and Government Services Canada, *Land Vehicle Crew Training System* (Ottawa: Bid Receiving – PWGSC, 2017), 5.

[3] Canadian Army Today, "From the road to the simulator: Combat Vehicle training in a virtual environment," accessed 15 January 2021, https://canadianarmytoday.com/from-the-road-to-the-simulator-combat-vehicle-training-in-a-virtual-environment/.

[4] Public Works and Government Services Canada, *Land Vehicle Crew Training System* (Ottawa: Bid Receiving – PWGSC, 2017), 14.

effectively streamline individual and collective training requirements into a single system. LVCTS has an expected fielding date of 2026 and an approximate $400 million cost.[5] In assessing how best to incorporate the LVCTS into army training, this paper will focus on three specific areas: IT, CT, and cultural/institutional considerations related to the use of simulation.

DISCUSSION

4.   <u>Incorporation into Individual Training</u>. As outlined in the project solicitation documents, the LVCTS is to be capable of supporting IT through the use of high-fidelity crew station replicas.[6] Both individual driver and gunner training will be possible using the system. The current gunnery simulators for the 120mm, 25mm and 40mm systems are stand-alone, low fidelity systems. In gunnery IT they are used to complete mandated firing tables in order to confirm gunner competency on immediate actions (IA's) and stoppages and application of fire techniques prior to the transition to live fire in accordance with the relevant weapon system training plan (TP). The current low-fidelity driver simulators function the same way and are utilized in the same manner during training. As the use of simulators is already a requirement nested in the TP's for armour vehicle gunner and driver training, incorporating the LVCTS can be easily achieved by mandating the use of this system over the older systems currently in use. As LVCTS will be a networked system, new drivers and gunners can be put through realistic combat scenarios and practice operating in concert with other vehicles during their training in a manner that is currently not possible in a virtual environment. Aside from core gunner

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[5] Canadian Army Today, "Vehicle crew training: Welcome to a new (virtual) reality," accessed 18 January 2021, https://canadianarmytoday.com/vehicle-crew-training-welcome-to-a-new-virtual-reality/.
[6] Public Works and Government Services Canada, *Land Vehicle Crew Training System* (Ottawa: Bid Receiving – PWGSC, 2017), 8.

and driver training, the LVCTS should also be incorporated into the following IT courses that represent IT nested within a CT framework: Infantry Officer Development Period 1.2, Armour Troop Leader Development Period 1 and 2 and the Combat Team Commanders Course (CTCC). The use of LVCTS in support of CTCC could potentially replace the requirement for an expensive field component while still providing high quality training to both the primary (CTCC candidates) and secondary training audiences (the supporting unit).

5.   Incorporation into Collective Training. The current virtual collective training environment available to the CA to conduct training between levels 2-5 is not particularly effective, is difficult to implement effectively, and does not train across multiple levels simultaneously. Consequently, current simulation capabilities provide little motivation for commanders to allocate precious training time to the conduct of virtual collective training. Virtual collective training within the level 2-5 space is often viewed as a way to fill calendar space, if necessary, rather than part of a progressive buildup towards field/live fire training. Once fielded, LVCTS will fundamentally change this dynamic and consideration should be given to mandating the use of the LVCTS in collective training, in the same fashion as live-fire training as part of the High Readiness (HR) collective training cycle. This can be achieved through inclusion as part of the CA High Readiness/Road to High Readiness Order. Furthermore, while Training for Land Operations outlines the three collective training stages: Preliminary, practice, and confirmation, it does not specifically mandate the use of virtual training during the practice stage which should be considered.[7] Similarly, Battle Task Standards (BTS), and

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[7] Department of National Defence, B-GL-300-008-FP-001, *Training for Land Operations* (Ottawa: DND Canada, 2014), 160.

in particular those which are specific to levels 3-5, do not mandate the use of virtual

training, unlike the US Army where use of their Close Combat Tactical Trainer (CCTT)

is in part driven by its inclusion within their Mission Essential Tasks List (METL).[8]

Within the CA, select BTS such as, BTS K44623093S - Execute a Mechanized Company

Attack for example, could be amended to indicate that the task needs to be achieved in

both a virtual environment and dry/live to be considered successfully completed.[9] A list

of recommended BTS can be found at Annex A. Consideration should be given to

mandating the use of collective virtual training through its inclusion in select BTS. It

should be noted that if the use of LCVTS is mandated for certain levels of training, it is

incumbent on higher commanders to ensure that sufficient time is being allocated to

achieve this training.

6.   <u>Cultural Aspects to Simulation</u>. Both the United States (US) Army and British

Army have a long history of utilising similar systems to the LVCTS concept. First fielded

in 1998, the US Army CCTT, provides virtual training up to the Battalion level (Bn),

incorporating realistic vehicle simulation of all key combat platforms.[10] Similarly, since

2002 the British Army has been using the Combined Arms Tactical Trainer (CATT) to

conduct training up to the Battle Group level (BG).[11] Their experiences with their

respective systems and the U.S. Army in particular, have provided some important

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[8] Phillip N. Jones and Thomas Mastaglio, *Evaluating the Contributions of Virtual Simulations to Combat Effectiveness, (*MYMIC LLC PORTSMOUTH VA, 2006), 25.
[9] Department of National Defence, B-GL-383-002/FP-001, *Battle Task Standards for Land Operations* (Ottawa: DND Canada, 2014), 591.
[10] "Lockheed Martin Rotary and Mission Systems - Close Combat Tactical Trainer and Reconfigurable Vehicle Tactical Trainer." *Jane's Simulation and Training Systems* (2019).
[11] "Lockheed Martin UK - Combined Arms Tactical Trainer." *Jane's Simulation and Training Systems* (2019).

cultural and institutional considerations that will need to be addressed to facilitate the incorporation of LVCTS into CA training.

7.   While simulation is already an accepted component of IT, the use of LVCTS as part of CT needs to be command driven. In studying the effectiveness of the CCTT, the US Army found that having a command driven approach to virtual training was key to its acceptance and effectiveness. It was noted that while live fire training was always supervised by the appropriate command level in relation to the training being conducted, virtual training was often inconsistently supervised by the next level of command or in some cases was not supervised at all meaning that training was often not linked to key outputs.[12] Additionally, while the use of CCTT was assessed as being a critical step in the transition to live-fire, it was at times treated differently by commanders, which in some cases created an impression that virtual CT was less important or less useful.[13] Within the CA context, while the concept of training being a command driven endeavour is already articulated in Training for Land Operations, experience indicates that virtual collective training is often not treated with the same importance as field or live fire training, which are generally considered superior and preferred over all other types of training.[14] The reinforcement of the importance of a command drive approach specific to virtual collective training will be key to the effective integration and use of this capability. One

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[12] Phillip N. Jones and Thomas Mastaglio, *Evaluating the Contributions of Virtual Simulations to Combat Effectiveness, (*MYMIC LLC PORTSMOUTH VA, 2006), 13.

[13] Phillip N. Jones and Thomas Mastaglio, *Evaluating the Contributions of Virtual Simulations to Combat Effectiveness, (*MYMIC LLC PORTSMOUTH VA, 2006), 13.

[14] Department of National Defence, B-GL-300-008-FP-001, *Training for Land Operations* (Ottawa: DND Canada, 2014), 27.

way this could be achieved is by applying the confirmation authorities laid out in

Training for Land Operations to collective training (level 3-5) conducted using LVCTS.[15]

8.   As the capabilities of the LVCTS are expected to exceed the current simulation

technologies in use, it will be important to educate commanders on the advantages of this

system in contributing to unit readiness as part of successful incorporation into the

training environment. As both the US and British armies now have long histories with

similar systems, their advantages are well known within their respective forces. The US

army found that commanders who utilized the CCTT agreed that it both increased unit

readiness and reduced resource consumption.[16] Furthermore, the LVCTS will allow

multiple levels to conduct training simultaneously, creating significant training

efficiencies. For example, a Combat Team Commander can execute a fully realized

combat team operation at the same time drivers and gunners are able to practice their

respective skills within a simulated vehicle environment. As this capability is not present

within current CA simulation systems, commanders will need to be educated on its

advantages. Additionally, the potential to reduce the use of stressed vehicle fleets, namely

the Leopard 2 fleet will also be a great benefit. Finally, as the after action review (AAR)

capability of the system is expected to far exceed what is currently available today, the

ability of commanders to review, correct, and improve the tactical performance of their

subordinates will be a considerable improvement that what is currently available. The

system is designed to "utilize data analytics to enable learning management and measure

when tactical competence has achieved a level that is ready to be confirmed and validated

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[15] Department of National Defence, B-GL-300-008-FP-001, *Training for Land Operations* (Ottawa: DND Canada, 2014), 154.

[16] Phillip N. Jones and Thomas Mastaglio, *Evaluating the Contributions of Virtual Simulations to Combat Effectiveness, (*MYMIC LLC PORTSMOUTH VA, 2006), 13.

during field or live fire training."[17] Finally, commanders must feel confident that virtual training provided by the LVCTS is not a replacement for field/live fire training but an effective supplement to it. The perception that virtual training is a threat to field/live fire training needs to be addressed and dispelled. Commanders will need to be made aware of the unique opportunities LVCTS presents to train more complex operational tasks in a low resource manner than what is possible during field or live fire exercises. The ideas above can be broadly though of as the need to build a "culture of simulation," whereby simulation when paired with field training are viewed as complimentary means of maximizing unit readiness.

9.   <u>Resource Management</u>. Once at FOC, the usefulness of the LVCTS system will no doubt create a high demand for the use of this training resource. As such, careful consideration must be given on how to prioritize its use in the expectation that it will draw multiple users with overlapping training calendars. CFB Gagetown, as home to the Combat Training Centre (CTC) will almost certainly have challenges in managing the availability of the LVCTS to support multiple schools in addition to 2nd Battalion Royal Canadian Regiment (2 RCR) and C Squadron (Sqn), Royal Canadian Dragoons (RCD). It may be preferential in some cases to limit the IT conducted using LCVTS for which simulators are already currently available (primarily gunnery simulators) in favour of CT. The exception to this would be for the following key individual training courses: Infantry Officer Development Period 1.2, Armour Troop Leader Development Period 1 and 2 and the Combat Team Commanders Course (CTCC).

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[17] Public Works and Government Services Canada, *Land Vehicle Crew Training System* (Ottawa: Bid Receiving – PWGSC, 2017), 21.

CONCLUSION

10.   The potential of the LVCTS to fundamentally change the nature of CA mechanized training is high, particularly within the level 3-5 CT space. Incorporating the system into existing IT will be comparatively easy as virtual training is already a required component of most courses and therefore largely represents an update to existing technology. The greatest challenges will revolve around how best to maximize LVCTS in the CT space. Obstacles to its effective incorporation will revolve around not whether the system is effective, but in overcoming the biases to virtual collective training that have been built around the experiences of leaders based on their experiences within the current CA simulation environment. An approach which seeks to create a "culture of simulation" while simultaneously looking at how best to mandate the use of virtual CT within the CA training framework offers the best way to incorporate this system into training.

RECOMMENDATIONS

11.   The following recommendations are made with respect to the incorporating the LVCTS into the CA training environment;

    a.   The use of the LCVTS should be command driven and training supervised and validated in line with CA confirmation authorities;

    b.   Consideration should be given to mandating the use of the LVCTS at specific CT levels, namely level 3, level 4, and level 5. This can be achieved through amendment to select BTS or through a Canadian Army Doctrine and Training Centre (CADTC) Order;

c.   CA needs to develop a "culture of simulation." This does not mean simulation replaces field training but that simulation and field training go hand-in-glove to maximize unit readiness; and

d.   Development of a system to appropriately manage the use of the LVCTS to maximize effectiveness, preferring if necessary, collective training over individual training were effective simulation systems currently exist. The exception to this would be Infantry Officer Development Period 1.2, Armour Troop Leader Development Period 1 and 2 and the Combat Team Commanders Course (CTCC).

Annex:

Annex A – Recommended Battle Task Standard List

Annex A - Battle Task Standard Recommendations

BTS	Task	Level	Organization
B05623093S	Execute an attack	5	Combat Team
B05653061E	Execute an advance to Contact	5	Combat Team
B05623092E	Establish and operate a firebase	5	Combat Team
B05633134E	Execute a defence	5	Combat Team
T23453061E/T24653061E	Execute an advance to Contact	3/4	Armour
T23423092S/T24623092S	Establish and operate a firebase	3/4	Armour
T23443080E/T24643080E	Execute a delay	3/4	Armour
K43423092S/K44623092S	Establish and operate a firebase	3/4	Mechanized Infantry
K4462309S	Execute an attack	4	Mechanized Infantry
K43423093S	Execute an attack	3	Mechanized Infantry

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