

Employment of Robotic Combat Vehicles in Large-Scale Combat Operations at Battalion Level: Observations from Project Convergence 22

by LTC Brennan Speakes and MAJ Sid McMath

"Blackhawk 6, what's your slant?"

"Sir, we only lost one robot."

The sun was just coming up over Tiefert Mountain and the fog still covered the desert floor. All troops completed pre-combat inspections and checks, boresighting and communication checks while they were still tucked into their attack positions.

The faint noise of a small motor and a green light moved in front of the squadron main body, slowly scanning, joined by three similar robotic combat vehicles (RCVs). Through a small screen, the vehicle controller identifies enemy boyevaya mashina pyekhotys (BMPs) massed behind the cover provided at Moose Gardens. The RCV operator sends the targeting data of the enemy BMPs almost instantly to the squadron mortars, and the platoon prepares the charges and rounds to destroy the threat.

The silence on the radio net is broken by a transmission from Apache Troop stating that three BMPs have been destroyed, while the RCVs continue their scan mere meters away from the precise mortar strike. Meanwhile, the squadron's troopers remain in relative safety behind the line of departure.

The RCVs continue scanning, cued by unmanned aircraft systems (UAS), and quickly uncover an anti-tank (AT) team nestled in the undulating terrain. The AT team spots the RCV and fires on the closest RCV, destroying it. The operator of the second robot in the swarm, serving as the human-in-the-loop, slews the RCV's M240 to the AT team, maneuvering to close the gap while firing several bursts. With the AT team destroyed, the remaining RCVs continue advancing to identify targets throughout the restrictive terrain.

After the destruction of an enemy platoon securing key terrain with observation of the central corridor, the squadron S-3 reports the updated battle-damage assessment to the squadron commander, followed by the S-2's assessment. It is a drastically different result than the previous day's events when the enemy handily destroyed a Bradley section from Blackhawk Troop. Today, the squadron owns the key terrain of the central corridor with only the loss of one RCV as the squadron continues to press the attack toward the east. And yet still, the squadron's main body remains concealed at the line of departure.

Introduction

The integration of RCVs on the front line during the fight against a determined and world-class opposing force (OPFOR) at the National Training Center (NTC) during Project Convergence 22 (PC22) greatly enhanced 1-7 Cavalry's ability to fight and win across all mission types while mitigating threats posed to the troopers. A surprising conclusion was that RCVs did not change the squadron's employment of current tactical doctrine. Instead, when used as the formation's vanguard, they extended the close fight within the existing battlefield framework through combined-arms layers of near-autonomous capabilities that allowed ground forces greater depth and reach.

Also, they proved promising in economy-of-force missions that enabled the commander to buy-down risk elsewhere on the battlefield while maximizing combat power at the decisive point. As well, the layers of depth created by these capabilities inherently reduced risk to the force by allowing friendly forces to make direct-fire contact with the enemy before the troopers themselves were exposed. In the end, however, despite these enhanced capabilities, their successful employment always came down to the fast-thinking ingenuity of the troopers and their leaders on the ground.

Concept of employment

The 1-7 Cav's main purpose at PC22 was to provide feedback on how to improve each technology's function, as well as to develop methods of employing these new technologies on future battlefields. Following 10 days of collective training from section, platoon and troop level and nearly three weeks of hands-on training with the new technology, the squadron deployed to the "box," prepared to fight Blackhorse (the OPFOR) daily for nine days.

The first day was fought without technology to establish the base case for the comparative case study. Each following day introduced a new type of technology, layering the complexity of the battlefield and providing the squadron with greater capabilities to defeat Blackhorse.

The squadron's first observation was how to design a battlefield framework given multiple unmanned aerial vehicles (UAVs) and RCVs. The standard tactic was combined-arms layering. Sensors such as UAVs served as the first layer, deployed forward of the formation as the forward-line-of-sensors (FLOS), collecting information requirements and identifying targets to feed the division's targeting cycle.

The forward-line-of-robots (FLoR) followed, acting as additional sensors, but also representing the first layer of direct-fire contact with the enemy. The forward-line-of-troops (FLoT), deployed in the supporting range of the FLoR, came last, shielded and informed by the first two layers. For the commander, this layered approach provided the additional decision space as enemy contact with the FLoS and FLoR stimulated the enemy to react, painting a picture of enemy activity and shaping the battlefield before committing troops.

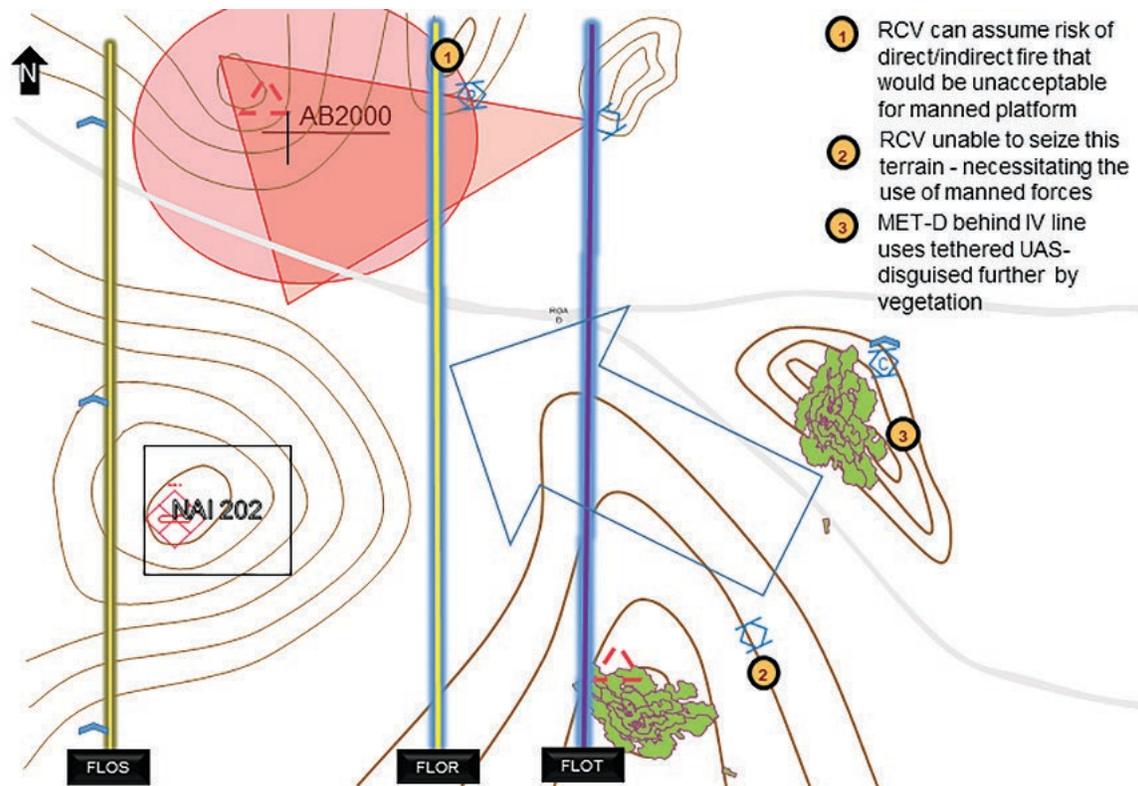


Figure 1. Templated area-reconnaissance tactics integrating RCVs. (Graphic by CPT Andrew Hall, Troop B, 1-7 Cav, 1st Cavalry Division)

With troopers safely postured behind the Brown and Debnam Pass complex, the squadron deployed the FLOS. These sensors extended the entire length of the central corridor, identifying enemy positions for division and squadron fires to destroy. The FLOS also extended to the squadron's exposed northern flank at Granite Mountain Pass, with capabilities that provided a near-autonomous reconnaissance force able

to forewarn the commander of an enemy attack and allowing him to concentrate more combat power at the decisive point.

Once the enemy was attrited to an acceptable level, RCVs deployed across the area commonly called no-man's land, a place with expansive fields of fire where advancing forces are historically destroyed. The RCVs advanced to the opposite side of no-man's land, concentrated on the Iron Triangle and Moose Gardens, acquiring and firing on more enemy targets unseen by the FLoS. The enemy, knowing these were unmanned RCVs, faced the choice of firing and exposing themselves to mortar and artillery fire, quietly staying in place to await detection and destruction, or displacing altogether.

Only once the FLoR cleared the way to the opposite side of the no-man's land at the Iron Triangle and Moose Gardens did the squadron deploy its troopers beyond the protection of the pass complex. Once deployed, the FLoT remained within the supporting range of the FLoR to ensure the RCV's survivability, while the FLoR effectively extended the FLoT's direct-fire range and observation range well beyond its organic capabilities. The enemy, now engaged, exposed itself to mortar and artillery fire, and two layers of direct-fire capabilities.

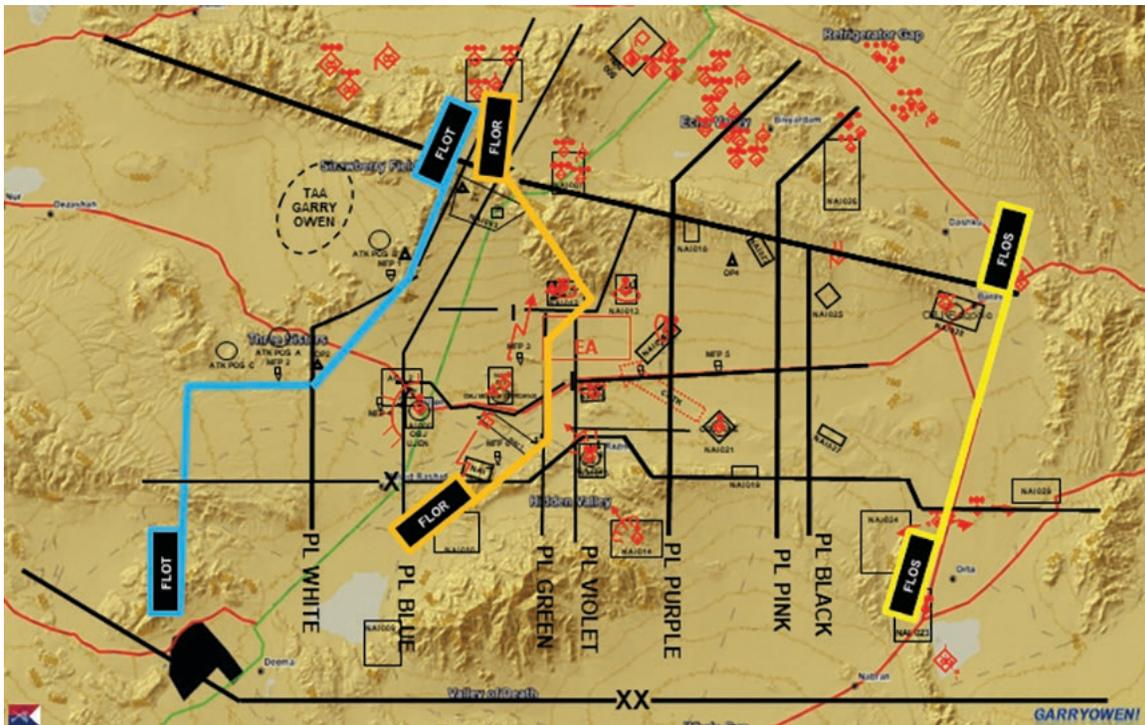


Figure 2. PC22 operations graphics depicting FLoT, robots and sensors in the "box" at NTC. (Graphic by CPT Max Laguna, 1-7 Cav, 1st Cavalry Division)

Concept in action

As described, Blackhawk Troop, weighted with RCVs as the squadron's main effort, massed RCVs on the Iron Triangle, the operation's decisive point and key to opening the central corridor. Blackhawk Troop easily seized this key terrain at the cost of only one RCV instead of the two Bradley Fighting Vehicles and many dismounts they lost on the base-case iteration.

Apache Troop saw similar results. RCVs combined with indirect fire proved formidable, and the enemy either displaced from or was destroyed at Moose Gardens. These capabilities allowed Apache Troop to seize this key terrain with almost no casualties.

Each day the results of these attacks were the same: RCVs enabled the squadron to cross no-man's land without the historically catastrophic losses taken by so many Cavalry squadrons in years past, and gain

that decisive foothold needed to enter the central corridor. RCVs proved equally decisive on days when all UAVs were grounded due to high winds. The squadron still advanced with the ability to achieve forewarning and engage in direct-fire contact with the enemy before troopers were exposed.

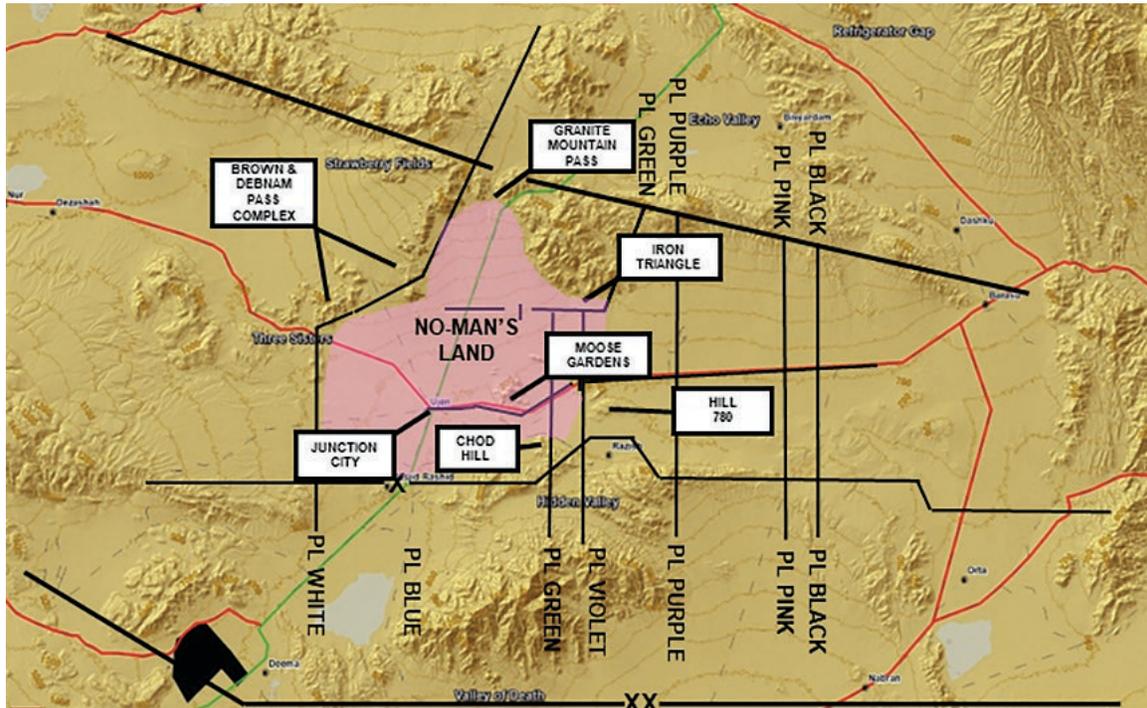


Figure 3. Key locations referred to during the scenario in this article. (Graphic by MAJ Sid McMath, 1-7 Cav, 1st Cavalry Division)

As the only troop not augmented with RCVs, Comanche Troop encountered significantly more challenges than their counterparts throughout the operation. Though they easily crossed no-man's land toward Chod Hill, passing south of Junction City, they met significant resistance once near the Peanut. Augmented only with additional UAVs, they were unable to identify and destroy enemy positions behind the safety of the FLoR. Days with high winds were particularly challenging, in contrast to Apache and Blackhawk Troops who, under similar circumstances, still performed well while supported by RCVs. Unsupported by either the FLoR or the FLoS, Comanche Troop's losses were consistently higher, ensuring they seldom got further than Hill 780.

Providing contrast to the squadron's observations, the experiment only allowed for RCVs to accompany the troops to Phase Line (PL) Green. Crossing PL Green without RCVs marked a downturn in the squadron's success each day. Both Apache and Blackhawk Troops found themselves facing greater risk, forced to decide between pursuing a delaying enemy that ultimately led to a kill zone or a slow advance exposed to relentless indirect fire. Once Blackhawk Troop seized the Iron Triangle, the inability to advance their RCVs further left their troopers with the task of clearing the intensely undulating terrain and deep draws in the mountain's wall, where the enemy often hid. Consequently Blackhawk Troop's advancement always slowed to a methodical pace, enabling the enemy to attrit them in close combat.

Comanche Troop's inability to advance much further down the central corridor beyond Chod Hill left Apache Troop's advance exposed. Unable to achieve a comparative advantage as a lone troop, the enemy, arrayed across the width of the corridor, consistently attrited Apache Troop. The threat owned the best terrain in the area, affording them protection from fires and the ability to prevent the squadron's forward momentum.



Figure 4. A Soldier operates a .50-caliber on an RCV variant during training. (Photo by LTC Jennifer Bocanegra, 1st Cavalry Division Public Affairs Office)

OPFOR reactions

Though the squadron's understanding of the OPFOR's reactions and decision-making when they were confronted by RCVs was limited, they clearly evolved over those nine days of fighting. The result was a daily contest where each side learned from and adjusted their previous day's plan, leveraging new tools and tactics to defeat the enemy.

When first confronted, the OPFOR withdrew to avoid observation. This proved advantageous to the squadron's ability to seize the Iron Triangle and Moose Gardens with almost no casualties on the first day of RCV employment. Their withdrawal enabled the squadron to retain maximum combat power when crossing PL Green, resulting in the squadron's most successful experimental day.

The OPFOR quickly adapted, however. Realizing that RCVs are just another combat vehicle on the battlefield, they began destroying them instead of withdrawing. These tactics worked well initially as the squadron's attrition rates of both RCVs and manned vehicles increased relative to previous days.

However, these tactics exposed the OPFOR to observation, as the squadron answered in kind with ever-increasing proficiency in mortar employment in support of robotic and manned vehicles. Simply enough, the squadron better integrated RCVs into the unit's combined-arms maneuver, allowing troops to destroy the enemy more quickly with direct and indirect fires while preserving RCVs and keeping troopers at relatively safer distances.

Observation and implications

Despite the potentially revolutionary implication of RCV employment on future battlefields, these implications and recommended changes to doctrine remain simple. The FLoS serves as a control measure, marking the extent of the unit's sensors and, when coupled with the range of indirect fires, defines the unit's deep fight.

The greatest change is in the depth of the close fight. Defined by the FLoR, RCV employment extends that depth by combining the RCV's direct-fire weapons range with that of those human operators in overwatch at supporting range and distance. One can further extend this depth by adding layers of overwatch

between manned and unmanned systems. Consequently, these minor doctrinal changes allow easy integration of RCVs into the Army's current way of thinking.

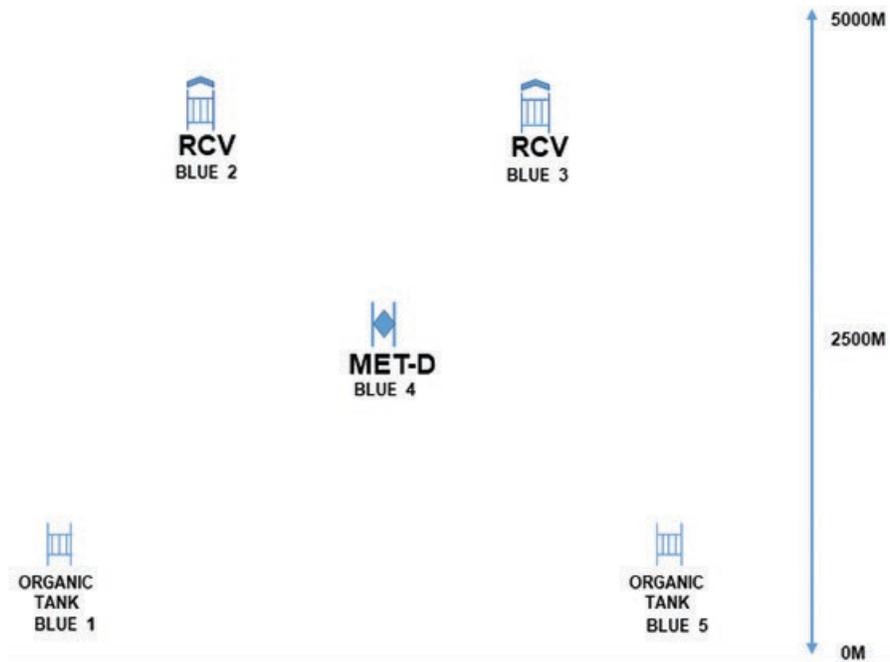


Figure 5. Example “M” vehicle formation integrating RCVs in-depth. RCVs lead the formation followed by the RCV control vehicle. Manned vehicles are last in order of march, remaining within supporting range. (Graphic by 1LT Hailey Kozma, 1-7 Cav, 1st Cavalry Division)

Tactical changes are where RCV employment proved most advantageous. RCVs are most suitable in jobs that proved dangerous, dirty or dull by limiting troopers' exposure to enemy fire and saving lives, or by keeping troopers focused on more meaningful tasks that only critically thinking humans can perform. This employment ranged from economy-of-force missions that freed up more combat power for the commander to use at a decisive point, to the decisive operation, where the commander could mass RCVs to buy-down risks to both force and mission at times and places that mattered most.

There was an array of missions not performed at PC22 where RCVs could play potentially critical roles such as combined-arms breaches, wet-gap crossings, prepared defenses, retrogrades and many more.

Conclusion

It is important to note that RCVs are not a silver bullet. By themselves, they are as exposed to enemy fire and easily destroyed as any other asset when not properly integrated into a balanced combined-arms approach. Though more attritable relative to troopers, RCVs are still a finite resource and need to be treated accordingly. Commanders must determine how RCVs fit within their total combined-arms concept and provide these capabilities the proper protection required to ensure their survivability for continued use.

Furthermore, RCVs do not remove, only reduce, the threats posed to troopers. Critically thinking troopers still play an indispensable role on the battlefield to make moral and ethical decisions and ensure a balanced employment of the total combined-arms team.

In short, RCV employment proved best when treated as just another tool in the combined-arms team while adjusting the battlefield framework to account for combined-arms layers. These simple changes enabled the squadron to more easily identify and destroy enemy positions while preserving both RCVs and, most importantly, troopers' lives.

Despite the significance of these new technological advancements, troopers, noncommissioned officers and officers proved the key to the technology's successful employment. Much of the technology was intuitive enough that operators quickly picked up the basics, and then adaptive leaders developed innovative employment concepts. The squadron's "digital natives," young people who grew up with modern technology, proved exceptionally adept at thinking through each technology's use and developing practical applications.

In the end, technology without human creativity is just an expensive target.

LTC Brennan Speakes commands 1-7 Cav, 1st Cavalry Division, Fort Cavazos, TX. Previous assignments include the executive officer to the commanding general of Combined Joint Task Force-Operation Inherent Resolve, Baghdad, Iraq; chief of the Commandant's Initiatives Group, U.S. Army Armor School, Fort Moore, GA; brigade S-3, 1st Security Forces Assistance Brigade, Fort Moore; G-3, Task Force Southeast, Advising Platform Lightning, Afghanistan; brigade executive officer, 1st Brigade Combat Team (BCT), 3rd Infantry Division, Fort Stewart, GA, and Europe; and S-3, 5-7 Cavalry, 1st BCT, 3rd Infantry Division, Fort Stewart. His military education includes interagency fellow in the National Capitol Region, Command and General Staff College (CGSC), Cavalry Leader's Course (CLC), Maneuver Captain's Career Course, Scout Leader's Course and Armor Basic Officer Leader's Course (ABOLC). LTC Speakes holds a bachelor's of science degree in business administration from Texas A&M University and a master's of business administration from Columbus State University. His awards and honors include three awards of the Bronze Star Medal, two Defense Meritorious Service Medals and four awards of the Meritorious Service Medal.

MAJ Sid McMath is the executive officer for 1-7 Cav, 1st Cavalry Division, Fort Cavazos. Previous assignments include deputy G-5, 1st Cavalry Division, Fort Cavazos; troop commander, B Troop, 2-13 Cavalry, 3rd BCT, 1st Armor Division, Fort Bliss, TX; troop executive officer, Dragon Troop, 2nd Squadron, 3rd Cavalry Regiment, Fort Cavazos; squadron scout-platoon leader, 2nd Squadron, 3rd Cavalry Regiment, Fort Cavazos; and tank-platoon leader, E Troop, 2nd Squadron, 3rd Armored Cavalry Regiment, Fort Cavazos. His military education includes the School of Advanced Military Studies (SAMS), Art of War Scholars Program at CGSC, CLC, Marine Corps Expeditionary Warfare School, Ranger Course, Army Reconnaissance Course and ABOLC. MAJ McMath holds a master's of arts degree in military operations from SAMS, a master's in military arts and science degree from Art of War Scholars Program, CGSC, a master's of arts in international relations from American University and a bachelor's of arts degree in political science from Hendrix College. His awards and honors include the Bronze Star and four Meritorious Service Medals.

Acronym Quick-Scan

ABOLC – Armor Basic Officer Leader's Course

AT – anti-tank

BCT – brigade combat team

BMP – *boyevaya mashina pyekhoty*

CGSC – Command and General Staff College

CLC – Cavalry Leader's Course

FLoR – forward-line-of robots

FLoS – forward-line of-sensors

FLoT – forward-line-of-troops

NAI – named area of interest

NTC – National Training Center

OPFOR – opposing force

PL – phase line

SAMS – School of Advanced Military Studies

TAA – tactical assembly area

RCV – robotic combat vehicle

UAS – unmanned aircraft system

UAV – unmanned aerial vehicle