The Integration of Commercial SUAS Quadcopters in MOS 19D OSUT Training

by CPT Nathan Kraemer and 1LT Gregory Brookover

The Russia-Ukraine war clearly indicates the importance of small unmanned aerial systems (SUAS) on the modern and future battlefield. As the U.S. Army gathers lessons learned from the European conflict and shifts its own priority to preparation for large-scale combat operations (LSCO), SUAS integration at all echelons is a top training priority. Though the U.S. Army pioneered the early use of SUAS systems, we failed to mass and implement the technology at the same rapid rate as the Russian and Ukrainian Armed Forces. We cannot effectuate our immense emphasis on and need for SUAS integration at the strategic and operational levels without acquiring and training on the relevant platforms at the tactical levels. An average cavalry troop often possesses one or two Ravens (drones) and a few Black Hornets (drones). These quantities are insufficient and require remediation.

Acquisition of commercial SUAS

A few months ago, the 194th Armored Brigade, a military occupational specialty (MOS) 19D/K One Station Unit Training (OSUT) Brigade, possessed a few platforms — one of which was operational. This lack of equipment drastically limited training opportunities for the Army's future cavalry scouts and armor crewmen. To alleviate this shortage, 5th Squadron, 15th Cavalry Regiment, a subordinate squadron in the 194th Armored Brigade, leveraged a recent Army-approved policy for the selective purchase of commercial SUAS systems for training purposes. These off-the-shelf products have: (1) enabled MOS 19D Cavalry Scout trainees to learn to operate with and react to SUAS, and (2) afforded cadre members the opportunity to experiment with the advantages of SUAS in reconnaissance and security missions. The 5-15 Cavalry's practice of purchasing commercial SUAS platforms, and associated lessons learned, should be replicated and disseminated across the force to yield maximal training output and preparation for LSCO.
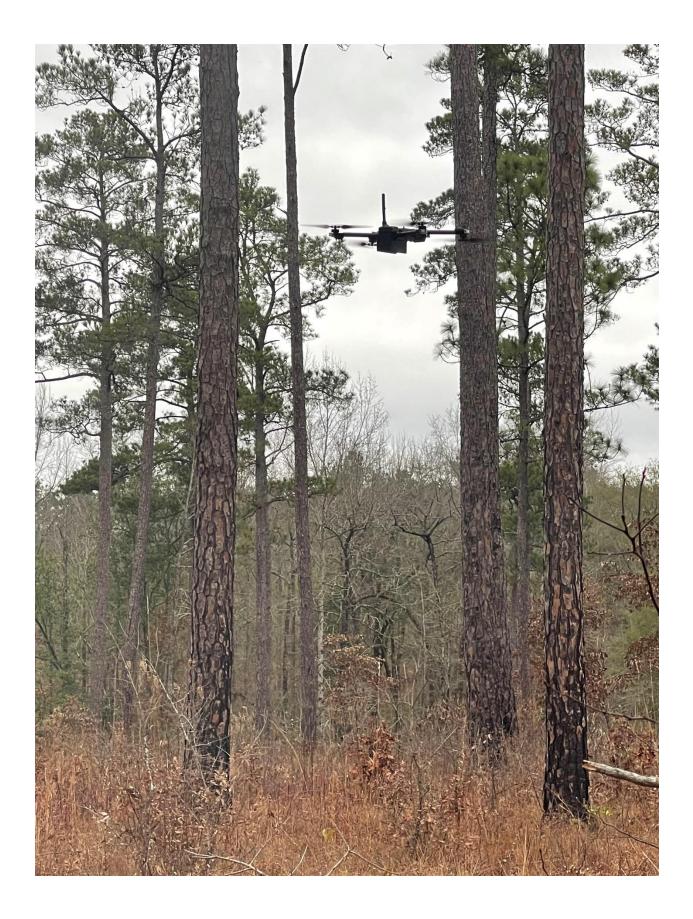
Figure 1. Drone operators within 5-15 Cavalry Squadron incorporate small-scale quad-copter SUAS drones into OSUT training. *(U.S. Army photo by LTC Mitchell A Payne)*

While the Army stands by for the recent Department of Defense (DoD) initiative to develop and mass produce SUAS systems to come to fruition, commercial purchases offer a feasible solution for training. Regardless of unit or command type, changing a unit's modified table of organization and equipment can be an arduous and time-consuming process.[1] Commercial-off-the-shelf (COTS) SUAS purchasing circumvents this problem and enables rapid equipment acquisition to train this critically important task. The 5-15 Cavalry purchased several COTS SUAS drones. Each item —purchased via the unit's Government Purchase Card (GPC) – was employed in training within three months of initial order submission. Each of the five troops within 5-15 Cavalry now has a dedicated drone for training and the squadron headquarters retains a reserve as well.

Training operators, maintenance

Even with the acquisition of the drones, 5-15 Cavalry needed to certify operators to fly the SUAS safely and within appropriate polices. Squadron and brigade SUAS master trainers ran a multi-day certification course. One day focused on classroom learning of SUAS and how to conduct minor repairs on drones (how to replace blades, motors and fix hard stops). Another day focused on hands-on flight training, and the last day was flight certification day. After completing the brigade course, operators had to complete an online course ran by the Air Force SUAS Manager (SUASMAN), the system of record for documenting SUAS training. The Air Force SUASMAN teaches more flight restrictions. The 5-15 Cavalry was able to train a 19D10 Cavalry Instructor (a recent graduate of 5-15 Cavalry OSUT) to become our primary drone operator in a few days.

When it comes to maintenance, the SUAS came with a few replacement rotor wings and spare batteries but that is all the spare parts available. Therefore, once we break a SUAS we will have to either figure out a way to fix it or we will have to replace it with the GPC. That is one reason the squadron bought a few extra SUAS to replace ones that will eventually break. The replacing of whole SUAS systems need to become a part of the squadron GPC budget moving forward just like with other consumable items.

SUAS in 19D OSUT

Adaptation for the future of warfare requires both doctrinal changes and new equipment. To facilitate this need, the U.S. Army's Maneuver Center of Excellence recently released a new "React to SUAS" battle drill for both mounted and dismounted units.[2] We now teach and train this new tactical development like any other battle drill. Before 5-15 CAV purchased commercial drones, troops were required to submit usage requests and deconflict training with adjacent units at the brigade-level. Now, each Troop in 5-15 Cavalry can plan and execute SUAS training to integrate the new battle drill into each field training exercise (FTX). With the new designated drone, we employed it for both offensive and defensive tasks in more than 20 sorties between two FTXs.

Figure 2. PFC Jeremy D. Shumpert (5-15 Cavalry) operates a drone during a FORGE FTX to train Soldiers how to react to SUAS while dismounted. *(U.S. Army photo by LTC Mitchell A Payne)*

Our troop commander traveled in a Humvee with the drone operator during a force-on-force situational training exercise. Sections or platoons of 19D trainees were able to request the asset from the troop headquarters. If approved by the commander, the drone operator moved the SUAS to the requested region and reported the intelligence collected to the requesting unit. When the unit under observation identified the SUAS in their area of operations, they were expected to react in accordance with the battle drill. In maintaining control of the SUAS asset at the troop-level, trainees were kept on their toes in the defensive and required to think critically about offensive opportunities to request and employ the technology. The SUAS feed also provided the commander with a unique ability to evaluate training from, quite literally, a bird's eye view.

The intent behind the SUAS was for Soldiers to associate SUAS with indirect fire when being observed. Observation posts (OPs) that failed to engage the drone were targeted with indirect fire, while observation posts that engaged the drone and subsequently displaced to a new OP were left alone. Additionally, the SUAS reinforced the fundamentals of reconnaissance in "Gain and Maintain Enemy Contact" with SUAS augmenting dismounted and mounted teams as well as "Do not keep reconnaissance assets in reserve," encouraging Soldiers to think about all assets available to them. The use of SUAS at our FTXs enabled Soldier's different views of their fighting positions or OPs, which contributed to more beneficial after-action reviews and teaching.

Throughout the course of the FTX, each Soldier had the training opportunity to conduct the "React to SUAS" battle drill in the defense and employ SUAS technology in the offense. The trainees began to understand the importance of overhead cover and concealment in their mounted and dismounted OPs. The new drones allowed the unit to demonstrate and train the importance of overhead cover and concealment to new Soldiers from their first day in the Army. This principle is critical across all skill levels. Training Soldiers to react to SUAS with real SUAS (even if commercial) and to evaluate Soldiers' ability to cover and conceal themselves aerially is a practice that can, and should, be implemented in most unit trainings at echelon.

Implementation considerations

The COTS drone model purchased by 5-15 Cavalry differs greatly from most models that our cavalry Instructors were familiar with from their previous Army assignments. Most units employ fixed-wing SUAS assets like the Raven and Puma, or small rotary-wing technologies like the Black Hornet. The COTS drone is a quadcopter. Like the Black Hornet (but unlike the Raven and Puma), quadcopters are vertically launched and recovered, which minimizes the amount of space needed for employment and enables greater maneuverability. Quadcopters can hover and move quite slowly relative to other models. This allows a more deliberate information collection process and enables the operator to maneuver the drone between trees below their canopy level. To mitigate the risk of collision in this environment, the COTS SUAS drone is equipped with sensors that alert the operator when objects are too close. On the other hand, a stationary quadcopter, or a slow-moving quadcopter flying at a lower level is easier to identify and destroy than a fixed wing SUAS.

Figure 3. Drone operators (5-15 Cavalry) use thermal imagery to highlight the capabilities of small-scale SUAS quadcopter drones. *(U.S. Army photo by LTC Mitchell A Payne)*

Quadcopters' relatively small size and light weight optimize its role in ground combat formations: Soldiers can easily carry the technology in their ruck while dismounted or store it in a vehicle without occupying much valuable space. While our quadcopter in Troop A, 5-15 Cavalry is not outfitted with a "payload," we could theoretically add one — a capability not possessed by the Black Hornet.

Our adversaries and allies in the Russian and Ukrainian Armed Forces, respectively, are employing several different types of SUAS, including quadcopters. We must develop and acquire similar products and train with commercial contemporaries to ensure preparedness for ensuing conflicts.

Platoon level recon/security

In implementing the quadcopter in our platoon-level reconnaissance and security operations in 19D OSUT, one of the greatest lessons to emerge involved the technology's stated versus actual capabilities. The product's advertised maximum distances and flight times are based on ideal conditions. These statistics do not account for wind or signal obstructions between the drone and its remote controller. Realistically, no military unit will ever operate in "ideal conditions:" there will always be suboptimal weather and an unclear line of sight between an SUAS platform and its operator. These obstacles do not render drone technology moot, but simply requires additional training and individual product analysis by the operating units. When we evaluated the drone's capabilities under *our* conditions, we identified a marked difference in its maximum distance in a wooded area versus in an open field or along a road. The drone could only reach about a 500-meter range in the woods despite

its manufacturer's claimed maximum distance of 12 kilometers. This reinforces the need for training and individualized assessments in the context of the reconnaissance and security mission sets.

The cavalry Instructors who operated the drone during our troop's FTXs and witnessed its employment, specifically referenced its potential advantages in security over reconnaissance missions. A drone's ability to cover dead space is instrumental in the security context, but the trainees' ability to identify the drone even at 100-feet elevation minimized its usefulness for reconnaissance. Commanders using SUAS technology for reconnaissance must carefully assess whether the asset is worth risking for information collection. If it is flown low enough to gather beneficial intelligence, is the risk of identification too high?

The decision to integrate SUAS technology in small-unit reconnaissance and security operations is greatly dependent on the commander's reconnaissance and/or security guidance (CRG/CSG) and the type of SUAS. The risk of potential drone identification is much more acceptable under rapid/forceful CRG, but perhaps untenable where stealth is paramount (depending upon the capabilities of the unit's SUAS). For example, under stealthy/deliberate CRG, the SUAS presence might dangerously reveal a scout platoon's location.

For counter SUAS considerations, we recommend commanders give detailed engagement criteria for SUAS systems by SUAS group type and SUAS actions (i.e., is the SUAS transiting the unit or hovering above the unit) in their CRG/CSG. In doing this, commanders enable a shorter decision-making process and shorter execution of the "React to Air" battle drill, which increases unit survivability. An OP, with this detailed guidance, can engage the right SUAS upon identification of the enemy SUAS, or they might displace upon identification. If the OP had to send the report to their platoon and then troop leadership for decisions, the SUAS might have already initiated a fire mission or engaged the OP. Additionally, until the scout platoon has organic counter SUAS capabilities beyond their organic weapons systems, there will be times when the CRG/CSG might preclude the troopers from engaging the enemy SUAS with direct fire weapons systems because it could give away their position. Therefore, a well thought out engagement criteria (or actions on contact), by phase of an operation that includes SUAS considerations will enable platoon level and below success in reconnaissance and security operations. In general, continued training with varied types of SUAS is warranted to truly understand the advantages and constraints of SUAS technology in cavalry formations.

Figure 4. The Company C, 5-15 Cavalry executive officer, 1LT Daren Pitts (left) coordinates with the drone operator, PFC Jeremy D. Shumpert to incorporate SUAS drones into OSUT training. *(U.S. Army photo by LTC Mitchell A Payne)*

Future of SUAS

The Army, specifically the Armor Branch, should evaluate the potential for SUAS use from an armored vehicle. We know that drones can be launched and recovered from the hatches of a Bradley Fighting Vehicle (BFV), but we have not yet tested if we can control the drone from under armored protection. If this is in fact possible, then scout platoons could employ SUAS to clear intervisibility lines and dead space prior to maneuver during rapid and forceful reconnaissance missions. If not, deployment from a BFV hatch could be preferable to dismounted team deployment to clear terrain prior to maneuver.

Conclusion

The Army's allowance of commercial drone purchases by subordinate units has critically enabled rapid implementation of such technology in support of requisite training objectives. After only a few sorties, SUAS integration has revealed important conclusions about the role of SUAS in cavalry formations and the development of specific tactics, techniques, and procedures based on drone-type.

We liked the quadcopter design and the potential for adding payloads and being able to fly it in restricted terrain. Additionally, this SUAS could be easily thrown into a ruck sack or assault pack and does not add much additional weight. In a future scout platoon, a quadcopter should be one of the SUAS available but maybe not the only one they have. Each SUAS has different advantages and disadvantages that can only be discovered through training with the equipment. Since the Army has opened some commercial drone usage, the cavalry community should

rapidly acquire and use these SUAS in training to help point the way forward for the best SUAS for reconnaissance and security operations.

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Notes

[1] John Grady. "DEPSECDEF HICKS: DoD wants Thousands of Drones to Counter China's Military Mass Advantage." **USNI News**, Aug. 28, 2023. https://news.usni.org/2023/08/28/depsecdef-hicks-dod-wants-thousands-of-drones-to-counter-chinas-military-mass-advantage.
[2] Task, 07-PLT-D8015 **React to Aircraft While Dismounted – Platoon;** and Task,17-PLT-D9515 **React to Air attack While Mounted – Platoon, Thunderbolt Blast,** Oct. 2023.

Acronym Quick-Scan

BFV – Bradley Fighting Vehicle
COTS – commercial-off-the-shelf
CRG – commander's reconnaissance guidance
CSG – commander's security guidance
DoD – Department of Defense
FTX – field training exercise
GPC – Government Purchase Card
LSCO – large-scale combat operations
OP – observation post
OSUT – one-station unit training
SUAS – small unmanned aerial systems
SUASMAN – SUAS Manager

Tank and Bradley crews from across the U.S. Army and partner nations compete during the 2024 Sullivan Cup Competition in the "React to SUAS and Vehicle ID" event at Good Hope Training Area on Fort Moore, GA, May 2, 2024. In the "React to SUAS and Vehicle ID" event, crews react to enemy drone movements. *(U.S. Army photo by Joey Rhodes II, Fort Moore Public Affairs Office)*