Bullets or Weapons: Rethinking Army's Approach to SUAS Integration

by LTC Mitchell Payne

At Fort Moore's 2023 Maneuver Warfighter Conference, senior leaders from across the military gathered to discuss the future of maneuver warfighting. GEN Randy A. George, Chief of Staff of the Army, laid out four focus areas, which included the need for continuous transformation. One example he mentioned was how the Army needs to fundamentally reexamine how we think about small, unmanned aircraft systems (SUAS).[1] He asserted that we need to stop thinking about the SUAS as an item in itself, indicating a need to holistically reframe how we look at SUASs at echelon. Along that vein, at the lowest echelon (squad, section, platoon), mini-SUASs should be treated like mortar rounds, not mortar tubes.

Current situation

Currently, the lowest echelon of the Army that has a dedicated SUAS assigned to it is the company/troop level, which typically has an RQ-11 Raven SUAS. The current cost per Raven is upwards of $35,000 per individual drone system, with a per-system cost of more than $250,000.[2] Other commercial off the shelf (COTS) systems currently in place in training come at a cost of more than $25,000 per unit.[3] Due to those high costs and the current structures in place for airspace management, those SUAS resources are held and controlled at the company or battalion level, which inherently restricts the use of SUAS at the lowest echelons. Furthermore, the high dollar value associated with those items often precludes junior leaders from using the equipment out of fear of losing the SUAS. Concurrently, due to the high costs of each of those systems, the equipment accountability of those systems requires a higher degree of scrutiny. These costs also inherently limit the availability of those systems at the platoon and squad levels; currently, companies or troops are only authorized one Raven System.

Organizations like the Maneuver Center of Excellence are making strides to procure less expensive COTS SUAS systems, with a cost of $1,059 per system.[4] This is certainly a positive step in pushing SUAS to the lowest possible levels. Despite the lower cost per system, however, if the organizational and cognitive frameworks at hand do not change as well, then the Army will still face the same integration and usage challenges. Army leaders at all levels must stop thinking of the SUAS as end-items in themselves.

But what happens if we contrast the current approach with a different approach – a reframed perspective? What dismounted infantry squad thinks twice (or even once) about the cost per round when they engage enemy forces with the dismounted M240b machine gun? What reconnaissance troop commander thinks about the cost per round when directing their Bradleys to engage enemy reconnaissance elements with 25mm in a counter-reconnaissance fight? The U.S. Army fundamentally needs to reframe how we think and treat mini-SUAS at lower levels. Army leaders need to learn to see mini-SUAS as bullets in a weapon system, not as an equipment system itself.

To a large degree, the U.S. Army is behind our pacing threats and military partners in how we look at SUAS. Australia has been sending disposable cardboard drones for use against Russian forces in Ukraine. In late August 2023, Ukrainian forces reportedly used those cardboard drones to attack an airfield in Kursk Oblast in western Russia. The attack damaged a Mig-29 and four Su-30 fighter jets, two Pantsir anti-aircraft missile launchers, gun systems, and an S-300 air surface-to-air missile system.[5]

Recent conflicts between Armenia and Azerbaijan saw the use of armed and unarmed drones as a turning point in the war for better targeting and even the destruction of armored forces.[6] Ukrainian citizens with no previous training are currently using commercially purchased consumer-level mini-SUAS drones to conduct reconnaissance on Russian forces in Ukraine, offering an "unprecedented advantage" to Ukrainian forces.[7] Do we think that anyone in any of those military forces is wasting their time conducting a Financial Liability Investigation of Property Loss for each cardboard drone or commercial mini-quadcopter they lose?

Reframing our perspective

Among other things, there are four steps the U.S. Army can take to reframe our perspective on the accountability and use of drones. If we adopt a "disposable" framework for looking at drones, then the Army needs to reexamine 1) how we supply mini-SUAS drones to the lowest echelons, 2) how we account for mini-SUAS drones, 3) how we incorporate mini-SUAS drones into our lowest echelon (e.g., squad, section and platoon) unit training, and 4) how we enable the use of mini-SUAS drones in our low echelon training.

Supply

If the Army looks at drones from a completely disposable framework, then the Army should reexamine the supply systems at work to get mini-SUAS drones into the hands of squad, section, and platoon leaders. Barring anything else (and operations security aside), remote-controlled quadcopter drones with 1080p camera interfaces are available on online for $49.99 with free two-day shipping.[8]

Alternatively, professional-level 3D printers are available for $4,000 - 10,000 dollars per unit,[9] and multiple designs for 3D-printed drones already exist at a single Web search. With the appropriate design schematics, small-scale drones could be printed for $500-$1,000 in materials and delivered to companies and platoons on daily logistical resupply. Mass-producing small-scale drones at the battalion and below level could produce 250 disposable drones for the cost of one RQ-11 Raven system. The technology to 3D print drones currently exists – the U.S. Army just needs to rethink its current cognitive and organizational frameworks to implement it.

Accountability

Tied to this are the equipment accountability processes at the unit level. If we keep the machine-gun/ammunition analogy for SUAS, no leader thinks twice about the cost per round when firing 7.62mm rounds. Those leaders are responsible for broad accountability of the ammunition associated with those systems but are not required to account for every single piece of brass or bullet expended in training. Army leaders should treat mini-SUAS drones the same way. The Army should maintain a broad degree of accountability for overall systems, but free up lower-level leaders from property investigations if we lose a "disposable" drone.

Imagine a logistical patrol that resupplies 3D-printed mini-SUAS drones to a company or reconnaissance troop, where that troop first sergeant is not required to account for each drone by serial number but can instead sign for them one batch at a time. How might mini-SUAS usage rates improve if leaders across all levels were no longer concerned about recovering a "disposable" mini-SUAS drone?

Incorporating drones in small unit training

If we consider small-scale drones as truly disposable, then this will inherently increase the capability to incorporate these drones into all aspects of training from the dismount infantry team or squad to the mounted reconnaissance platoon. In all warfighting functions and across all branches, small-scale drones can and should be used. At the 2023 Maneuver conference, GEN James E. Rainey, commanding general of U.S. Army Futures Command, said, "We're kidding ourselves if we think we're going to avoid fighting in cities."[10] Accepting this premise, why should we put our armored vehicles in harm's way when we could identify hazards in the immediate area with one or more small-scale disposable drones? Why should our dismount infantry squads walk into the unknown when they could contact a squad-level disposable SAUS first?

Alternatively, incorporating small-scale disposable SUAS should be an inherent aspect of reconnaissance operations. When dismount scouts establish a hide site, the first thing they should do is throw the recon squad quadcopter in the air to provide additional situational awareness. If that disposable SUAS identifies a potential target, that can que higher echelon (brigade) unmanned aircraft system assets with GPS capability to support indirect fire missions.

Enabling drones in small unit training

The current training requirements to fly the RQ-11 Raven or other COTS SUAS currently in use require multiple degrees of training and certification. This training starts with online training, introductory flights, and subsequent monitored and unmonitored flights, all of which take about two weeks per individual SUAS operator for mini drones. Once the operator is certified, however, using the SUAS still requires a high degree of coordination, including requesting airspace, establishing a restricted operating zone (ROZ), and various training report roll-ups.

Airspace requests on Army installations are also limited by civilian airspace management, which requires Federal Aviation Administration (FAA) coordination for every single time a SUAS is flown.[11]

Contrast this with the reality that if one were to leave a military post, any grade-school-aged child can (and does) fly commercially procured drones without filing a flight plan through the FAA. More to the point, it bears asking if the Ukrainian military requires Ukrainian civilian drone operators to file flight plans before they use their disposable commercial drones to identify, target and destroy Russian forces in urban centers.

The main premise of this paper is that the U.S. Army should fundamentally rethink small-scale mini-SUAS drones as inherently disposable. If one accepts this premise, then the Army should also align training practices and structures to better reflect how it will fight. If we treat small-scale drones as disposable, then the Army should consider placing a blanket ROZ over installations that would allow unlimited small-scale mini-drone operations at low-level altitudes below a reasonable threshold (e.g., 200 feet above ground level). Organizationally, if the Army continues to place multiple requirements for the training and operation of small-scale drones, then the Army will never bridge the cognitive gap between reframing doctrine and actual practice.

Conclusion

On the final day of the 2023 Maneuver Warfighter Conference, the U.S. Army Training and Doctrine Command G-2 gave a brief that discussed the threats that the Russian and Chinese militaries pose. In that brief, he highlighted the importance and relevance of SUAS in the current Ukrainian war and the subsequent observations that both the United States and the Chinese military have been making.[12] Large-scale combat operations in the future will be characterized by the proliferation of SUAS at all echelons. If the Army fails to reconsider how it thinks about SUAS – if we continue to treat all SUAS like a weapon system and not as an expendable round – then we run the risk of falling behind our peers.

Current drone technology is making drones cheaper, faster, and more available to all members of the population. Unfortunately, the Army's antiquated modes of thinking and training requirements for SUAS are causing us to lag behind our peers and competitors. If we do not change our cognitive and organizational frameworks, then Russia's lessons learned in Ukraine will become the U.S. Army's lessons to re-learn in future conflicts.

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Notes

[1] GEN Randy A. George, Chief of Staff of the U.S. Army. "We need to think about SUAS like a keyboard or a mouse…" 2023 Maneuver Warfighter Conference, Opening Remarks, Sept. 12, 2023.

[2] General costs are public domain information and available as follows; "RQ-11 Raven Unmanned Aerial Vehicle," ***Army Technology.com***, RQ-11 Raven Unmanned Aerial Vehicle, United States of America (army-technology.com). Specific information can be found using the ***Force Management System Website*** (FMS Web). Accessed Sept. 12, 2023.

[3] Valerie Graves, Equipment Purchase Quote – RQ 28 Skydio X2 SUAS, ***ADS systems***. July 25, 2023.

[4] Roger Davis, Equipment Purchase Agreement – DJI Mini 3 Pro SUAS, ***Adorama Systems***. Aug. 24, 2023.

[5] Paul Cureton, "How Australian cardboard drones became a critical innovation in the Ukraine war." ***ABC News***, Sept. 2, 2023. How Australian cardboard drones became a critical innovation in the Ukraine war - ABC News.

[6] Benjamin Brimelow, "A brief, bloody war in a corner of Asia is a warning about why the tank's days of dominance may be over," ***Business Insider***, Nov. 24, 2020. Drones Use in Armenia-Azerbaijan War Raises Doubt About Tanks' Future (businessinsider.com).

[7] Matt Burgess, 2022; "Small drones are giving Ukraine an unprecedented edge." ***ARS Technica***, May 8, 2022. Small drones are giving Ukraine an unprecedented edge | Ars Technica.

[8] Amazon.com; Accessed Aug. 13, 2023. Amazon.com: DEERC D40 Drone with Camera for Kids, D40 FPV HD 1080P Mini Aircraft for Adults Beginner, Foldable Quad Hobby RC Plane, Toys Gifts, 2 Batteries 20 Mins Flight Time, Easy to Fly,1 Piece, Black : Toys & Games.
[9] 3D Sourced. 2023. "How Much Does a 3D Printer Cost? (Price & Maintenance)." ***3D Sourced***, Aug. 8, 2023. How Much Does a 3D Printer Cost? (Price & Maintenance) - 3DSourced.
[10] GEN James E. Rainey, Army Futures Command Commanding General remarks; Maneuver Warfighter Conference, Fort Moore, GA; Sept. 13, 2023.
[11] Federal Aviation Administration, 2023, "Certificated Remote Pilots including Commercial Operators," https://www.faa.gov/uas/commercial operators; Accessed Sept. 14, 2023.
[12] Ian Sullivan; "Russia/China Deep Dive Brief;" 2023 Maneuver Warfighter Conference, Fort Moore, GA; Sept. 14, 2023.

Acronym Quick-Scan

COTS – commercial off-the-shelf
FAA – Federal Aviation Administration
ROZ – restricted operating zone
SUAS – small unmanned aircraft systems

Figure 1. Dr. Dan Kingsley (left), senior managing engineer at Exponent, tests a drone's tether cable during Allied Spirit 24 at the Hohenfels Training Area, Joint Multinational Readiness Center, Germany, March 6, 2024. Allied Spirit 24 is a U.S. Army exercise for its NATO Allies and partners at the Joint Multinational Readiness Center. The exercise develops and enhances NATO and key partners interoperability and readiness across specified warfighting functions. *(U.S. Army photo by Spc. Micah Wilson)*