



Look Up: The Future of Fire Support and Loitering Munitions

By 1LT Ryan Lavin

An ever-present truth to warfare is that it constantly evolves with the times and technology available to belligerents. This continuous evolution has been the case throughout the history of our country, and our Army now finds itself potentially in another wave of innovation and development based on lessons learned from Ukraine. The introduction of loitering munitions over the last decade has brought a new threat to Soldiers and equipment on the battlefield. Drones bought off store shelves, equipped with explosive devices and ultimately flown directly to their target are weapons that the United States (U.S.) has yet to face en masse, nor have we employed ourselves throughout our formations. As we consider their use in a Large-Scale Combat Operation (LSCO) environment through Ukraine's fight against Russia, drone warfare has taken the center stage. Thousands of drones—used both for observation and as loitering munitions—take flight each day as the war continues. Loitering munitions have been effective in Ukraine at targeting prepared positions and vehicles in a timely and accurate manner at the lowest combat echelons. The advantages that loitering munitions provide have made them invaluable assets to Ukraine's maneuver companies and battalions in their LSCO fight. For the United States, it will pay dividends for the Field Artillery to begin to consider the framework for providing and utilizing loitering munitions as fire support assets at the maneuver company and battalion levels to best continue achieving the branch's mission.

The mission of the Field Artillery is to destroy, defeat or disrupt the enemy with integrated fires to enable maneuver commanders to dominate in unified land operations (Army Doctrine Reference Publication 3-09). The artillery branch is designed to utilize all fire support assets at its disposal in order to achieve the effects desired by the maneuver commander. It is in this thinking that loitering munitions be considered as another fire support asset in the Army's maneuver formations. Their use and integration into overall fires plans will better provide commanders with the ability to accomplish their missions by destroying, neutralizing or suppressing enemy targets prior to sending ground troops to move on their objectives.

The intent behind this commentary is to spark discussion as to the Field Artillery's role in sourcing, planning and utilizing loitering munitions as fire support assets. Experiences in Ukraine offer various ideas on how drones could fit into existing Army formations and be used in conjunction with current fire support platforms. Some of the major factors to consider include drone design, their procurement through defense manufacturers and how the Army, with new doctrine, implements them throughout its maneuver formations.

The Field Artillery branch is best poised to lead the way in the creation of doctrine, development and implementation of loitering munitions across the maneuver forces of the Army. As discussed above, fielding such a weapon coincides directly with the mission of the Field Artillery in utilizing all fire support assets to enable maximum freedom of maneuver. The modernization of fires is one of the major initiatives for the Department of Defense over the next decade, focusing on large investments and research into long range precision fires. As important as these investments are for modernizing our Field Artillery capabilities, investing in loitering munitions as an organic fires and targeting capability to our lowest maneuver elements would yield immense fire support advantages to troops in the close fight going forward. The Field Artillery is best positioned with its ties to the defense manufacturing industry to design and acquire a loitering munition system that can be fielded to the force with low input costs, establish doctrine for its use and develop training systems, all with the experience and resources available at the Fires Center of Excellence (FCoE) to ensure its successful implementation. The technology for loitering munitions and off-the-shelf drones already exists. It remains key to evaluate potential designs and provide our Army with a weapon system best able to both provide flexible fire support and enable maneuver units to accomplish their objectives.

There are different drones and loitering munitions designed for different purposes throughout our own and other nation's armed forces. Unmanned aerial vehicles (UAVs) can fly at a variety of speeds and altitudes and be equipped with unique payloads, namely cameras or sensors for intelligence purposes. The maneuver company and battalion levels are most notably equipped with Raven and Puma UAVs which can be launched and controlled directly at those echelons for reconnaissance and targeting purposes. Loitering munitions used in Ukraine have adopted similar variety based on their purpose. Some munitions are large, built for long range flight and heavier payload delivery, as seen in Ukrainian loitering munition attacks on Moscow over 450 kilometers from the front lines. The U.S. military retains similar capabilities in its U.S. Air Force (USAF) MQ-9 Reaper drone with its 3,800lb weapon payload capacity. Most loitering munitions on the battlefield today at the company-level, however, are much smaller in size and designed to support the close fight. They are either quadcopter-styled or fixed wing drones with different purposes of their own. Loitering munitions of a quadcopter variant often hover over a potential target and drop a grenade or mortar-sized munition onto it before returning to its user to be recharged and rearmed. The other dominant design is a fixed wing munition, which carries a payload directly to the target and detonates such munition on impact. The Army, in its research and development of a loitering munition, would need to determine the variant design that best allows the company and battalion levels to produce proper effects on targets in their area of operations. For example, a drone could be equipped with a shaped-charge munition aimed at the destruction of armored vehicles for one mission and later be equipped with a mortar or grenade instead for targeting bunkers and enemy personnel. Such a munition would need to be cost-effective, interoperable with existing UAVs in operation and ultimately fielded across Army maneuver formations.

Loitering munitions have been domestically produced in both Russia and Ukraine with imported parts or bought complete from countries abroad. Their prices range from hundreds to hundreds of thousands of dollars depending on the mission set or payload capacity of a loitering munition. In a recent interview with the Wall Street Journal, one Ukrainian commander commented, "Exploding drones cost roughly \$400 to make, while a conventional [indirect] projectile can cost nearly 10 times as much. Even if it requires multiple drones to take out a tank — and sometimes it does — it is still worth it" (Trofimov 2023). The ability for a loitering munition to disable a multi-million-dollar combat vehicle for only pennies on the dollar is a capability worth having in U.S. inventories at large. A point to consider is how we, as an Army, can develop a loitering munition capability that possesses such accuracy, remains cost-effective to produce en masse, is resistant to jamming or counter-UAV threats and can be fielded at speed to maneuver battalions and companies across the force.



A U.S. Marine Corps Hero-400 loitering munition drone is staged before flight on San Clemente Island, California, May 25, 2022

In Ukraine, observation drones are making a significant difference on the ground at the company and battalion level in combat. Short-range drones allow these maneuver elements to gain accurate intelligence estimates about enemy positions and numbers on the battlefield. Observation drones have also been used to call for and adjust indirect fires on both Russian and Ukrainian positions. The U.S. possesses the capability to utilize observation drones in a similar way at those echelons as well. Where Ukrainian and the United States' capabilities diverge are in the use of drones as loitering munitions. Ukraine makes use of such weapons daily at the lowest maneuver echelons and have seen the combat benefits in having such a flexible weapon system. Loitering munitions, often used in conjunction with an observation drone spotting targets on the ground, can prosecute targets of opportunity within a company or battalion area of operation more responsive than using indirect fire assets along the kill chain. The targeting guidance of a loitering munition is also more precise compared to indirect fires. Drone operators can visually walk their munition onto their target with live-feed cameras affixed to the munition and achieve near-precision effects. These weapons provide maneuver units with the ability to attack enemy forces with an organic fire support asset in direct support of their unit.

Any massed formation or prepared position within a battalion area of operations could be targeted and neutralized using a loitering munition within minutes. The war in Ukraine has seen many examples of this. One Ukrainian General recently said, "Today, a column of tanks or a column of advancing troops can be discovered in three to five minutes and hit in another three minutes. The survivability on the move is no more than 10 minutes" (Kullab 2023). Loitering munitions provide a further asset to attack targets detected in a fast-paced and dynamic battlespace when other weapon systems may be unable to support. Battalion mortars or FA batteries are often tied to a fire support plan and target list worksheets that limit the flexibility of those firing units to prosecute other fire missions outside of such plans in a timely manner. Target degradation can result in less-than-optimal effects on targets attacked with indirect fires. Loitering munitions with the ability to change location with speed and prosecute targets within a company or battalion area of operations would lighten the load for all other firing units in providing another pillar for maneuver units to attack targets. The onus would fall on maneuver commanders and fire

supporters to plan for the supply of ammunition across the firing units and allocate targets in accordance with what those units can support. Key to this would be developing sustainable targeting criteria for the use of a loitering munition, mortars or cannon artillery in prosecuting a mission.

Acquiring a loitering munition at the company and battalion echelon brings to question which element would control such weapons. The maneuver headquarters element or the fire support team at both company and battalion provide the best reasoning for controlling loitering munitions. In utilizing the fire support team (FiST) at both echelons, loitering munition operators would be able to integrate their use into the overall fires plan of both the maneuver battalion and brigade. This would ensure that the proper fire support asset, whether mortars, artillery or a loitering munition, are all used to achieve the desired effects on planned or opportunity targets at large. Retaining loitering munitions use at the company and battalion headquarters could provide responsive attack capabilities for targets of opportunity within their respective areas of operation; however, it could also require further coordination with a higher echelon fires cell to ensure that no other fires have been allotted to attack a target in question. Having loitering munitions placed with a maneuver headquarters would keep control of such munitions directly with the maneuver commander to control alongside their mortar assets. Even so, their use would need to be coordinated through the FiST regardless to ensure that munitions are not used or wasted on targets already slated for mortars or artillery.

The control of loitering munitions also brings to question how the structure of the FiST would change to implement loitering munitions. There are already drone operators within maneuver companies and battalions trained on the UAVs used at those levels, but having a specialized loitering munition operator(s) as a part of the FiST or company headquarters would ensure timely and accurate use of the weapon on the battlefield. Implementing a UAV weapons team at both echelons, complete with their own vehicle along with rearming and recharging capabilities, would be a lethal and effective way to organize and accommodate loitering munition capabilities within either the FiST or company headquarters. Such an arrangement would also ensure that adequate resupply or logistics measures could be planned for with a UAV weapons team and its loitering munitions. In total, the organization of maneuver elements to best incorporate loitering munition capabilities will need to focus on how to best structure units to optimize their immense fire support advantages to the maneuver unit's mission.

The advent of loitering munitions has brought a new factor for the U.S. Army to consider in a LSCO environment. The FA branch can play an instrumental role in developing the systems, doctrine and structures to best place these munitions into the hands of the American Soldier. Troops on the ground going forward will not only have to scan their sectors on an opposite ridgeline for enemy movement but also monitor the skies and camouflage their positions to avoid being targeted by loitering munitions. America cannot afford to fall behind the power curve, nor our adversaries, in fielding such weapon systems at company and battalion levels. Beginning the process of procuring loitering munitions will ensure that our maneuver forces have every fire support asset available in their arsenal for tomorrow's fight.

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