

35th ADA Brigade leads the charge for C-UAS operations in PACOM

By Capt. Jonathan Pasley

Keen observers in the world of air defense have been watching one trend in particular during the past several years: the proliferation of unmanned aerial systems (UAS). Once an advantage enjoyed solely by technological Western nations, the use of drones has transitioned into the hands of the civilian consumers and by extension into the hands of insurgents such as the Islamic State militants encountered in Iraq and Syria. Their tactics and techniques could easily be adopted by hostile actors around the globe. Our military procurement system has struggled to compensate for the emergence of this new threat, but E Battery, 6th Battalion, 52nd Air Defense Artillery, under 35th Air Defense Artillery Brigade in Korea, has now become the leading element in Pacific Command to address this new and dangerous threat.

What makes drones dangerous? The Russians have demonstrated the ability of unmanned systems to put real-time intelligence, surveillance, and reconnaissance (ISR) capabilities to devastating use against Ukrainian forces as artillery spotters.¹ Many UAS models (military or civilian) can provide accurate location data from ranges that make them almost undetectable with the naked eye, so that the first warning forces on the ground will get is deadly incoming artillery fire. The insurgents in Iraq and Syria have added another spin, equipping off-the-shelf Chinese-made quadcopters with grenade munitions for precision placement of explosives in urban conflict.² Even commercial quadcopters are surprisingly difficult to destroy with small-arms or crew-served weapons, because they present a very small and highly maneuverable target and have redundant engines. A small

“drone swarm” conducted an attack on a Russian airbase in Syria which resulted in several key airframes lost to fires started by the drones.³ As hostile actors refine this type of coordinated attack, the drone threat will only become more dangerous to ongoing operations.

Why are we not able to engage drones with existing air defense weapons systems? In many cases, it is because such small targets did not exist when the current weapons systems were designed. The high-to-medium air defense, or HIMAD weapons systems, such as Patriot and the Terminal High Altitude Air Defense (THAAD) system that make up the bulk of U.S. Air Defense Artillery weapons are not well suited to counter-UAS operations. Even detecting such small and often nonmetallic targets is a tricky balancing act; most air defense systems are designed to filter out small objects in the environment (such as birds) so that they do not overwhelm a system with possible threats. This can allow small aircraft to slip through detection, which may have been what enabled Yemeni Houthi rebels to crash an Ababil-type unmanned drone into a United Arab Emirates Patriot radar being employed in Saudi Arabia.⁴ Notably, software changes and system upgrades are refining the C-UAS abilities of existing systems, as illustrated by the successful Israeli engagement of a UAS with a Patriot missile in November of 2017.⁵ However, this is a very expensive solution as drones may cost tens of thousands of dollars where a single Patriot interceptor will cost more than \$2 million. This is a wasteful use even if you ignore the financial implications because every Patriot missile used this way is one not available for the primary system mis-

sion of defense against deadly ballistic missiles.

What about Short Range Air Defense Artillery (SHORAD)? While certainly a more practical solution than firing Patriot interceptors, even the Stinger-missile-equipped Avenger and supporting Sentinel radar systems employed in the Army’s SHORAD batteries are not designed for C-UAS. In the absence of a credible air threat during the counterinsurgency operations of the past decade and more, there has been little emphasis on development or employment of SHORAD forces for this role. Most SHORAD batteries were relegated to the National Guard, and the unarmored Avengers they employ are typically not permitted to deploy overseas. There are programs underway to adapt these systems to C-UAS duties (including new Stinger variants and Sentinel radar upgrades). However, these systems still have the disadvantage of being kinetic systems which were originally designed for a wartime environment – they present a significant risk of collateral damage if employed in an environment with a large civilian presence. Operations during the armistice between North and South Korea provide an objective example – no risk to civilian lives or property will be tolerated during armistice operations. A non-kinetic solution is needed.

Enter E/6-52nd ADA. As part of Combined Task Force Defender, they are tasked with defending D Battery, 2nd Air Defense Artillery THAAD Battery at Seongju-ri near Daegu. This is a challenging mission with a genuine North Korean threat⁶ and restrictive armistice rules of engagement. To accomplish this mission, the battery became the first unit in U.S. Pacific Com-

1 Freedberg, Sydney J. “Russian Drone Threat: Army Seeks Ukraine Lessons”. *Breaking Defense*, 2018, <https://breakingdefense.com/2015/10/russian-drone-threat-army-seeks-ukraine-lessons/>. Accessed 13 May 2018.

2 Watson, Ben. “The Drones of ISIS”. *Defense One*, 2018, <https://www.defenseone.com/technology/2017/01/drones-isis/134542/>. Accessed 13 May 2018.

3 Treothick, Joseph. “Russia Offers New Details About Syrian Mass Drone Attack, Now Implies Ukrainian Connection”. *The Drive*, 2018, <http://www.thedrive.com/the-war-zone/17595/russia-offers-new-details-about-syrian-mass-drone-attack-now-implies-ukrainian-connection>. Accessed 20 May 2018.

4 Gibbons-Neff, Thomas. “Houthi Forces Appear To Be Using Iranian-Made Drones to Ram Saudi Air Defenses in Yemen, Report Says”. *Washington Post*, 2018, https://www.washingtonpost.com/news/checkpoint/wp/2017/03/22/houthi-forces-appear-to-be-using-iranian-made-drones-to-ram-saudi-air-defenses-in-yemen-report-says/?noredirect=on&utm_term=.7f667ce035ac. Accessed 13 May 2018.

5 Associated Press. “Israel Uses Patriot Missile to Shoot Down Drone”. *Defense News*, 2018, <https://www.defensenews.com/land/2017/11/13/israel-uses-patriot-missile-to-shoot-down-drone/>. Accessed 13 May 2018.

6 Reuters Staff. “Suspected North Korea Drone Spied on U.S. Anti-Missile System”. *U.S.*, 2018, <https://www.reuters.com/article/us-northkorea-southkorea-idUSKBN1940J8>. Accessed 13 May 2018.

mand to receive the Expeditionary Low, Slow, Small UAS Integrated Defeat System (E-LIDS). Already employed in several countries in U.S. Central Command, this system uses many of the same components employed successfully in the Counter Rocket, Artillery and Mortar system and turns them against UAS platforms instead. E-LIDS was sped into production and is not yet a program of record, but operational testing has already been conducted to ensure the system is ready and capable of accomplishing its mission. In addition to this, E Battery has also fielded the Drone Defender man-portable C-UAS system which will enable a flexible and layered defense against any UAS incursion with minimal risk of collateral damage. These systems permit the battery to conduct not only area denial, but also to electronically “defeat” enemy UAS that could threaten critical U.S. assets. This in turn ensures that the THAAD system is able to continue to preserve freedom of movement around the peninsula.

The THAAD site at Seongju-ri presents a ready testbed for C-UAS systems, as systems like E-LIDS and THAAD have never before been integrated into a single defense design. Additional systems are already being considered for incorporation and testing. The 2nd Battalion, 1st Air Defense Artillery and 35th Air Defense Artillery Brigade are maximizing the opportunity and recording a number of lessons learned from the first such site in the PACOM area of operation (AOR). The units on CTF-Defender are engaged daily in shaping the doctrine for the use of these systems. From this initial test site comes the possibility of expanding the use of these systems to units across the Korean peninsula and across the PACOM AOR. E Battery has already demonstrated the capability to emplace the systems in new locations, and will continue to improve integration into air defense planning on the peninsula.

The danger from increasingly creative use of UAS is a real threat, and the capability gap for existing systems is clear. However, with such a unique opportunity for integration of the C-UAS mission set into air defense artillery units, E Battery and by extension the 35th ADA Brigade are in a key position to lead the development of tactics, techniques, procedures and doctrine governing the effective employment of these systems. Air defense artillery will help blaze a path in this new domain for the rest of the Army to follow. “First to Fire! Ready in Defense!”

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A Stinger missile team with the 35th Air Defense Artillery Brigade, identify an unmanned aerial vehicle target, during Rim of the Pacific Exercise 2018 at Pacific Missile Range Facility Barking Sands, Hawaii, July 24. (Capt. Rachael Jeffcoat/U.S. Army)



Target acquisition for long-range precision Fires

By Patrick McKinney

The Army has identified long-range precision Fires as a top modernization priority to support great power competition and defeat and deter peer competitors on the battlefield. Though informed by recent challenges in Europe and Asia, conflicts of the past half a century have taught the Army the criticality of not only long-range and accurate Fires, but also the need for accurate target acquisition. To utilize its future long-range precision Fires, the Army must field capable and reliable multi-domain long-range target acquisition capabilities.

At the start of the Cold War, the Army prepared for large-scale combat against the Soviet Union and its Warsaw Pact allies in Europe, but instead found itself committed to sustained combat in Southeast Asia. The Vietnam War taught the importance of firepower and artillery, but diverted the Army's resources and investments from modernization for fighting in Europe. Army studies and analysis identified an emerging Soviet force superiority of materiel and numbers in Europe and recommended that the Army refocus its force to the threat.

The Army's AirLand Battle and its "active defense" sought to keep the Army and its North Atlantic Treaty Organization allies fighting while attriting the larger enemy force. A critical component of AirLand Battle was long range precision Fires to disrupt and destroy Soviet targets at deeper echelons of the fight. These requirements led to the Multiple Launch Rocket System, Advanced Tactical Missile System, and improved lethal munitions that proved their effectiveness in Operation Desert Storm in 1991.

Combat in Kuwait revealed that though Iraqi artillery often outranged American cannon artillery, its lack of coordinated target acquisition and fire support made it ineffective. The Army however, maximized its target acquisition and fire support capabilities to provide accurate targets and deliver accurate massed Fires. Despite the successes, the Gulf War revealed limitations with U.S. artillery's range, mobility and rate of fire, and reinforced the need

for dedicated target acquisition capabilities (such as unmanned aerial vehicles).

The Russian invasion of Ukraine in 2014 surprised the Army and raised new concerns of competitor superiority in Europe. Though the Soviet Union and Warsaw Pact dissolved in 1991, NATO continued an eastward expansion that included Baltic States bordering Russia. A possible NATO expansion into Ukraine and the Ukrainian government's western-tilt were deemed unacceptable to Russia, and through proxies and non-declared Russian "little green men," Russia invaded the Crimea and the Donbas regions of Ukraine.

These forces utilized massed artillery, unmanned aerial systems, electronic warfare, information warfare and other capabilities that have not challenged the United States in recent conflicts. Russia continues to develop missile technologies, air defense radars and other anti-access, area denial (A2AD) capabilities to slow and deter NATO forces in Eastern Europe. In Asia, China develops and fields similar systems aimed to deny its potential enemies access to China's shores and the region's waters.

More than a decade of combat in southwest and central Asia have diverted the Army's resources and investments from modernization for fighting a peer competitor, and the Ukrainian invasion exposed the Army's readiness challenge in Europe. In response, the Army identified new modernization priorities, with long-range precision Fires at the top.

The Army fears that Russian, Chinese or other competitor systems will outrange American Fires, and that threat A2AD systems risk American air superiority or control, and in turn, that the Army cannot assume it will have air support in future fights. If this is true, how will the Army identify and verify long-range targets in a future fight? If the Army needs long-range precision Fires due to this aerial capability gap in an A2AD environment, can it rely on air assets to provide target acquisition for its long-range precision Fires?

Traditional target acquisition comes from ground and air observers, radars, op-

tics and sensors. In a contested A2AD environment, the Army may lack ground and air observers and electronic collection systems at the ranges needed for long-range Fires. There are non-materiel solutions (such as deploying batteries and launchers further behind the forward line of troops), but these will minimize the Army's ability to strike deep targets.

To utilize long-range precision future Fires in a contested A2AD environment, the Army needs to develop alternate multi-domain target acquisition capabilities. Studies questioned the need for long-range precision Fires in the 1970s and 1980s because of the challenges in identifying deep targets, and longer range enemy systems proved ineffective in 1991 due to their lack of target acquisition capabilities. Accuracy and long range are wasted if the Army cannot see its target. If the Army continues to prioritize long-range precision Fires, it must develop and invest in multi-domain target acquisition.

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