



XM1299 Extended Range Cannon Artillery at the National Training Center 20-10

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In September of 2020, the 1st Infantry Division (1ID) rotated through the National Training Center (NTC) 20-10. It was the first time a Division rotated through as well as a proof of concept was tested regarding the Reinforced Cavalry Squadron (RCS) model. The 1st Division Artillery (DIVARTY) deployed to support 1ID as the Force Field Artillery Headquarters. In addition to their organic Paladin Battalions, 1ID controlled a guest Battalion of M270 Multiple Launch Rocket Systems (MLRS), simulated M777A2 Howitzers,

and simulated Extended Range Cannon Artillery (ERCA). Given the physical restrictions on maneuverable space, only one Paladin and one MLRS battalion were present at the NTC, whereas the other Artillery Battalions were simulated from response cells at Fort Irwin Cantonment Area and Fort Riley, Kansas. While this rotation validated Divisional operations in a contested environment, the RCS, and the employment of DIVARTY, the rotation illuminated the effectiveness of a new weapons platform:

the ERCA. It demonstrated the profound impact of the ERCA to the Division fight and the promise of renewed supremacy in land-based warfare.

Background On Erca

The XM1299 ERCA is the next artillery platform for the United States Army. Designed by BAE Systems, the ERCA is the next step in modernizing the nation's Field Artillery capabilities against peer adversaries. Still in the prototype stage, the ERCA boasts a longer tube, improved breech, and an autoloader, mounted on

the existing M109A7 chassis.¹ The ERCA has demonstrated its ability to fire a round over 65 km to within one meter of a target.² This outclasses the M209A7 and M777A2 Howitzers by more than twice their range. The autoloader is templated to fire 10 rounds a minute sustained, once again eclipsing any cannon artillery in the arsenal. With its improved range and rate-of-fire, the ERCA shows exceptional potential on paper. However, it is a revolutionary platform of which no current unit or Soldier has experience.

Train-Up to NTC, Employment in DG II & III

During its training trajectory for the NTC 20-10, 1ID conducted three Command Post Exercises (CPXs) called Danger Gauntlet (DG) IV. DG IV was the culminating training event executed at NTC 20-10. The majority of the DIVARTY staff which attended NTC 20-10 executed DGs II and III, which incorporated ERCA into the DIVARTY's task organization. DGs II and III also had similar troop lists as DG IV, including the ERCA, MLRS, Paladin, and M777A2 units. Each of these units was represented by a work cell and executed without realistic constraints and friction such as maintenance or communication. The Paladin and M777A2 Battalions spent much of their time as direct support to the RCS or their organic Brigades, and therefore received positioning guidance and answered Calls for Fire primarily from their parent organization in support of the

Division close fight. The ERCA and MLRS Battalions were General Support (GS) to 1ID, therefore they received their positioning guidance from DIVARTY and supported the deep fight: shaping in between the Coordinated Firing Line and the Fire Support Coordination Line.

The 1ID DIVARTY Commander's guidance for planning and fighting his artillery was to "Fight Fires Forward," or employ the GS artillery as far forward as possible to maximize range and then destroy the enemy with large volleys. This translated to the GS Field Artillery Battalions moving rapidly forward just behind the Brigade Combat Teams (BCTs) main elements or the initial screen line during the counter reconnaissance fight while the BCTs were uncoiling from their Target Audience Analysis. Positioning these Battalions forward ostensibly makes more of the enemy available to shoot. Saturating the enemy artillery and air defense in indirect Fire is a must to ensure the enemies' total annihilation. This clear and simple guidance drove the planning cycles for each of the Danger Gauntlet CPXs and framed the schemes of Fires and Field Artillery Support Plans (FASP) the DIVARTY developed. The DIVARTY staff planned 3x3 km Position Areas for Artillery (PAA) over ground the DIVARTY S2 analyzed as sufficient for cannon cant tolerance. These PAAs covered nearly all the unrestricted terrain in the area of operations, as the staff planned to move frequently. Due to the unfamiliarity with both the ERCA

and MLRS platforms and the lack of available doctrine on ERCA, the DIVARTY staff planned both the MLRS and ERCA to use these PAAs interchangeably. Since the guidance was to saturate the enemy in Fires, both Battalions were consolidated in one PAA each and expected to fire significant volumes of Fire. Due to the limitations of the simulation employed in the CPX, ammunition resupply was not well-rehearsed and the resupplies were unbridled by terrain or enemy. This created an unrealistic expectation of ammunition expenditures unconstrained by a controlled supply rate and near-instantaneous Class V resupply. Once the DIVARTY staff received the Fragmentary Order (FRAGORD) stating a realistic Controlled Supply Rate, an updated Maneuver plan, and an enemy long-range artillery threat, they realized their old procedures for fighting deep-shaping battalions was insufficient.

Concept of ERCA Employment in Planning

The DIVARTY staff deployed directly into Forward Operating Base Santa Fe at Fort Irwin with a scheme ready to execute. Upon synchronizing with the MLRS operations team in person for the first time due to COVID-19 and receiving a FRAGORD from 1ID, the staff quickly executed Rapid Decision-Making Process to refine their current concept of Fires. The MLRS' bottom-up refinement on how to best utilize their formation in terms of munitions capabilities and

1 Todd South, "The Army is 'making artillery great again,'" *Army Times*, March 11, 2020, <https://www.armytimes.com/news/your-army/2020/03/11/the-army-is-making-artillery-great-again/>

2 Jared Keller, "Watch the Army's new supergun nail a target from 40 miles away," *Task&Purpose*, March 10, 2020, <https://taskandpurpose.com/military-tech/army-extended-range-cannon-artillery-video>



Extended Range Cannon Artillery, or ERCA, will be an improvement to the latest version of the Paladin self-propelled howitzer that provides indirect fires for the brigade combat team and division-level fight. Building on mobility upgrades, ERCA will increase the lethality of self-propelled howitzers. ERCA provides a “10x” capability through a combination of an increased range, increased rate of fire, increased lethality, increased reliability and a greater survivability. Photo by Edward Lopez, June 12, 2018

operations area requirements necessitated another look at their employment. Additionally, the tempo of the Division’s fight was elevated, requiring more aggressive posturing of GS units forward, which fits the tenet underlined by ATP 3-09.60³ *Multiple Launch Rocket System (MLRS) Operations and HIMARS Operations*. Therefore, the DIVARTY staff reworked the FASP and published a new scheme of Fires.

The new concept for the GS Battalions included redefined roles for each platform. Due to the limitations on ammo received for the rockets, the DIVARTY staff reserved them

for planned missions on soft or stationary targets such as air defense or command posts. The traditional combat load for MLRS supporting Corps includes a great number of Army Tactical Missile Systems. Since our Guest Battalion was acting as a Division asset and not a Corps shaping unit, they received the Guided Multiple Launch Rocket System only. The ERCA would serve as the workhorse- prosecuting both counterfire and dynamic targets that required rapid execution. Due to the simulated theatre and situation, VII Corps was the main effort of the United States Army in Europe and therefore received the coveted Bonus MK II Round. While enemy armored

forces enjoyed relative safety from indirect Fires in the past, the Bonus MK II Round penetrates armor with a roughly one-for-one round per tank ratio. Simultaneous with these changes, the staff reallocated land for PAAs so that each PAA would be a 4x4 km area. Each of our guest MLRS’ two batteries would receive their Operation Area (OP AREA) and the ERCA would receive one PAA. Though the ATP 3-09.60 maintains a 4x4 km operational area for each platoon, we were unable to provide such a large amount of land.⁴ The scheme retained the aggressive “Fires Forward” mentality, however, since the MLRS battalion was truly on-ground and not simulated, they were relegated to on-post land only.

Begin ERCA Employment Actual DG IV

Once the force-on-force portion of NTC 20-10 began, the DIVARTY staff confronted several challenges with the ERCA. First was the initial volume of Fires requested from 1ID was significantly greater than anticipated. Instead of firing around fifty missions a day as in DG II and III, the ERCA was firing over a hundred missions a day split between counterfire, deliberate, dynamic, and Suppression of Enemy Air Defense (SEAD) Fires. Because of this, the DIVARTY and ERCA response cell split the battalion into three PAAs to maximize the space in which each battery could conduct survivability moves. Unfortunately, splitting the ERCA battalion into three separate PAAs greatly diminished

³ ATP 3-09.60, 3-1.

⁴ ATP 3-09.60, 4-12

responsiveness for battalion massing since the Division Joint Air-Ground Integration Cell had to clear three distinct locations. Therefore, ERCA transitioned from firing Battalion volleys to primarily firing Battery volleys. The DIVARTY reserved massing the ERCA Battalion for enemy Battalion- and Brigade-sized formations which were stationary and justified longer Target Selection Standards. As force-on-force progressed, the great preponderance of Fire missions was sent to the ERCA to service due to its flexibility and responsiveness. The 1ID's Battalions fought a tough close-fight with enemy indirect Fire systems with significant counterfire. The Division's GS Battalions, however, fired with little to no fear of repercussions.

The second challenge effect of the volume of Fires on how each ERCA battery conducted survivability moves, managed ammunition and maintained equipment. ERCA's initial survivability criterion was to conduct a survivability move within their PAA after every Fire mission. Due to the volume of Fires, this became untenable with multiple Fire missions queued for each firing battery. Therefore, DIVARTY refined the survivability criteria to conduct survivability moves within their PAA after three to four Fire missions or during any lull in the firing. The Battalion Fire Direction Center (FDC) then managed those moves and reported when they needed to conduct survivability moves. Ammo resupply with the volume of Fires required a daily resupply with forecasting out to 96 hours. We exercised

“just in time inventory” at the beginning of the rotation as we adjusted our consumption tables to account for the higher volume of Fires. This was critical to ensuring continuous Fires and was personally managed by the DIVARTY Executive Officer in a daily staff synch. Additionally, maintenance became an issue with the volume of firing for the ERCA. The tube life for the XM 907 is currently templated at 700 rounds with the supercharge propellant firing at max range. ⁵Additionally, if the tube temperature reached 350 degrees, then the tube required a mandatory 24 hour period to cool down. The ERCA response cell simulated these constraints by rotating firing batteries and managing their Battalion Fire orders. Despite this management, there were times ERCA sections were down for maintenance for 24 hours to account for tube wear and temperature.

A third challenge was the change in command-support relationships with the ERCA. During one of the lulls in the fighting, our Paladin battalion requested the ERCA provide GS Fires to the RCS to allow the Paladins to reconsolidate, conduct Battalion resupply, and refit operations and then reposition to better support the RCS next zone reconnaissance the following morning. The ERCA BN was able to provide these GS Fires without having to reposition its forces and with no degradation to its deep shaping Fires. The extraordinary range capabilities of the XM1299 allow for the Battalion to fire into the far northern corridor in the area of operations and shape the deep

fight in the central and southern Maneuver corridors of the area of operations simultaneously.

A fourth challenge was the assistance to the Combat Aviation Brigade's (CAB) deep attacks in the form of SEAD. The CAB conducted a period of darkness deep attack nearly every night and consequently submitted a robust request for SEAD every day. The ERCA battalion consistently provided suppression of enemy air defense for these missions. ERCA's munition flexibility allowed for specific rounds per target type as well as last-minute “audible” changes to targets. Having the capability to range up to 70 km to suppress or destroy air defense enabled the CAB to not only expand its attack distance but expand its target SEAD targets to allow for a more comprehensive suppression. Though the DIVARTY staff does not recommend it due to ammunition and planning requirements, the ERCA regularly suppressed or destroyed over a dozen targets for SEAD near simultaneously.

The last challenge of the ERCA was in its fight against the enemy's armor. Of course, the Bonus MK II Round was the key to this challenge, which arguably provided the greatest advantage of the ERCA. While the Bonus MK II Round was reputed to be a revolution, 1ID had yet to utilize this round; simulation or otherwise. This combination of extended range up to 50 km and anti-tank munitions changed the course of the battle. As 1ID moved west and occupied the initial objectives, the enemy received a mechanized brigade

of reinforcements and launched a devastating counterattack. The counterattack caused the Division to halt and the GS Battalions to retrograde to more secure PAAs and OP AREAS. This was in anticipation of the roughly 200 (T-90) MS Main Battle Tanks consolidating to attack through the southern mobility corridor. The 1ID quickly identified the force and its supporting air defense assets. Then, the 1ID cleared all air in the south and sent DIVARTY a single Fire mission targeting this enemy Brigade Tactical Group. The DIVARTY Fire Control Officer directed the ERCA to fire twelve battalion volleys of the Bonus MK II Round. The ensuing Fire mission destroyed 135 T-90s in minutes thus effectively ending the enemy's counterattack and ensuring the initiative remained with 1ID. The ERCA would subsequently destroy the remainder of the T-90s in piecemeal Fire missions using that munition.

Of note was the pairing of the AN/TPQ-Q53 RADAR and the ERCA, which could fire out to the RADAR's maximum sensing range. The enemy medium and light indirect Fires were focused on the close fight with the BCTs and RCS and chose to prioritize those formations over the GS Battalions. Therefore, the DIVARTY's Counterfire became a game of "whack-a-mole," trying to destroy the dispersed medium artillery as quickly as possible to support the BCTs in the close fight. The medium artillery was lower on priority on the High Payoff Target List, but VII Corps shaping effects had been effective at destroying the enemy long-range artillery. Therefore, the ERCA Battalion received minimal counter

Battery at its formations and could fire with near impunity in the counter firefight.

Summary and Future Considerations

The ERCA response cell consisted of an FDC, with one AFATDS box operator sending to the simulation operators. This system was not entirely realistic, however, it created enough links in the mission chain to somewhat simulate realistic FDC processing times. Since the platform will come equipped with an autoloader, the unrealistic mission times could be near accurate. Therefore, the value of the experiences and knowledge learned from the ERCA during the rotation shouldn't be discounted completely due to simulations.

The XM1299 ERCA dominated the battlefield during NTC Rotation 20-10. Positioned just behind Maneuver forces to fire forward, the ERCA had ample range in which to Fire missions, providing extraordinary responsiveness when Division acquired targets. The very nature of cannon artillery enables munition flexibility, as the round only needs to be on hand and not pre-loaded. This platform destroyed tanks, artillery, electronic warfare assets, and air defense with lethal efficiency. Furthermore, the ERCA can easily assist in the close fight for GS relationships when needed; the platform will not need to relocate to range. The fundamentals of the cannon propellant allow for flexibility on short or longer ranges.

The ERCA is capable of firing roughly 70 km, but that would ostensibly require a full load of supercharges. The wear

from such a propellant load will rapidly degrade a tube if combined with the ability to shoot far and with an autoloader. ERCA units will need to be able to rapidly replace tubes due to excessive wear. They may need to even have the Forward Support Companies (FSC) carry them to switch out as quickly as possible, which would need to be a priority training objective for those FSC Commanders.

The extended tube and range of the ERCA does raise a few concerns. Is the XM1299 ERCA capable of direct Fire on encroaching enemies? Though it is preferable to avoid the situation, direct Fire has saved countless Artillerymen. If it is still possible, then Battery Commanders should ensure sufficient space between sections to enable direct Fire when applicable.

Communications are the other main concern. The ERCA can fire at such long ranges that traditional FM communications are potentially insufficient. The ERCA command posts were regularly located in mountainous areas 30 km or more from our nearest command post during NTC Rotation 20-10. ERCA Battery and Battalion FDCs should come equipped with both high-frequency radio and Warfighter Information Network-Tactical (WIN-T). The ERCAs must also have sufficient Joint Battle Command Platform coverage throughout the formation. While high-frequency has a slight lag time for transmission, WIN-T requires adequate satellite coverage. Both options, however, are preferable to setting up an OE-254/GRC Antenna Group at each occupation.

The XM1299 ERCA is the future King of Battle. The platform's flexibility, adaptability, range, and lethality ensure its dominance in the indirect Fires domain. Developing clear and effective targeting in conjunction with flexible air and ground clearance procedures for ERCA will result in devastating effects on the battlefield. Doctrine should be unique and carefully

crafted through numerous large-scale exercises for the ERCA. Simultaneously, the Army must maintain the MK2 Bonus round or an equivalent to enable dominance against armored threats. In near-peer or peer adversaries, air superiority is not guaranteed. Allowing the ERCA space and time to work will repay all investment with interest, and victory.

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Current Weapons of the U.S. Army Field Artillery



Left Column:

M119A3 105 mm light towed howitzer

M777A2 (Triple-7) 155 mm medium towed howitzer

M109A7 (Paladin) 155 mm self-propelled howitzer



Right Column:

M142 (HIMARS) High Mobility Rocket Artillery System

M270A1 (MLRS) Multiple Launch Rocket System

Photo credits: U.S. Army