A New Combined-Arms Approach for the Armored Brigade Combat Team

by Steven A. Yeadon

A new way of integrating the combined arms of the armored brigade combat team (ABCT) when it's combined with the deployment of the Joint All-Domain Command and Control (JADC2) network is needed to maximize unit capabilities during a war against the major powers in an era of all-domain operations.

JADC2 – the emerging term senior Department of Defense (DoD) officials are using to describe linking military sensors to all warfighters across all services and domains – will provide decision-makers with the most accurate situational awareness possible. To make JADC2 a reality, the Pentagon will first need to identify and leverage a highly flexible, scalable common data platform that can accommodate DoD's vast amount and types of data from across the service branches. A successful JADC2 program will also infuse data across domains with artificial intelligence and machine learning to allow machine-speed analysis and real-time situational awareness, helping funnel the right data to the right commanders or operators at mission speed.[1]

This article makes the case that JADC2 changes armored warfare because detected indirect-fire weapons can swiftly destroy detected enemy units. The best way to implement this tactic is for all forward armored units to possess indirect-fire weapons. No longer must the battle tank be the main foil through direct-fire engagements.

'Battle of signatures,' 'ascendancy of fires'

This analysis bases itself on two concepts called the "battle of signatures" and the "ascendancy of fires." The ***Marine Corps Operating Concept: How an Expeditionary Force Operates in the 21st Century*** states that the future of warfare will depend on a "battle of signatures": "Tomorrow's fights will involve conditions in which 'to be detected is to be targeted is to be killed.' Adversaries will routinely net together sensors, spies, unmanned aerial systems (UAS) and space imagery to form sophisticated 'intelligence, surveillance, reconnaissance (ISR) strike systems' that are able to locate, track, target and attack an opposing force. In complex terrain, adversaries will collect targeting information through eyes and ears and spread it through social media. No matter the means of detection, unmanaged signatures will increasingly become a critical vulnerability."[2]

Thus a decisive factor for land warfare is to stay undetected because detected forces face swift destruction by enemy fires. As the war in the Donbass region of Ukraine shows, this idea of a battle of signatures may already be in effect against the Russian military due to the combination of Russian massed area fires assisted by overhead surveillance. This reconnaissance-strike model was central to the Zelenopillya rocket attack that destroyed most of two Ukrainian mechanized battalions that were in the open in July 2014.[3] [4]

Second, the concept of an "ascendancy of fires" originally stems from a statement in ***Field Artillery Journal*** by GEN Glenn K. Otis in 1995.[5] As the Federation of American Scientists explains: "The ascendancy of fires is a concept that describes the combined results of the improving ability to 'see the battlefield' while simultaneously attacking at depth with precision lethality. The ascendency of fires describes a potential trend where land warfare is becoming more like sea and air warfare – i.e., forces will fight at increasingly greater ranges in 'demassed formations.' In this setting, combat elements conducting superior information operations and employing state-of-the-art smart/brilliant munitions, robotic vehicles and swarms of unmanned aerial vehicles can conceivably shape the battlefield and conduct decisive operations, possibly without coming in visual contact of each other. This would produce a dispersed combat situation where small, powerful, highly mobile tactical units employing precision fires fight almost independently over incredibly large distances. The national mandate to win quickly with minimum casualties remains the driving factor in the emerging ascendancy of fires."[6]

A serious question to raise in 2020 is, "Are we approaching an 'ascendancy of fires'?" This concept, first explored in the 1990s, will soon apply to current battlefields against a near-peer power. The development of the JADC2 network will allow a maturation of both the battle of signatures and the ascendancy of fires for U.S. forces against potential enemies. U.S. ground units should organize around the predicted principle of small, lethal, highly mobile

tactical units employing precision-guided indirect fires as they fight almost independently over incredibly long distances.

This article analyzes the necessary changes in doctrine to improve ABCT combined arms. It will then examine the current and necessary materiel to improve ABCT combined arms according to this new doctrine. It will conclude by finishing the rest of the doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) analysis on this new concept.

New concept for ABCT combined-arms doctrine

To begin, the need for mobile protected firepower and infantry to engage targets at direct-fire ranges will not go away. This analysis assumes the best way forward is to alter the weapons on Infantry Fighting Vehicles (IFVs) and main battle tanks (MBTs) to take advantage of information dominance while retaining their direct-fire capabilities to directly engage and defeat an enemy should there be a need for an armored fist. Armored formations are best for an ascendancy of fires due to their mobility, survivability and lethality, which can be repurposed for indirect fires. Also, this analysis sees a use in supplying armored and mechanized-infantry battalions with new units that can take advantage of a superior ability to "see" the battlefield.

This future can be enabled for U.S. forces through the acquisition of specific weapons that will add greater agility. The most important are indirect-fire weapons capable of destroying enemy armored vehicles for both MBTs and IFVs. Thus, they will be indirect-fire platforms that can also excel in direct-fire engagements. There will also be a use for units of indirect-fire anti-tank guided missile (ATGM) tank destroyers, such as those in-development by Poland,[7] to add volume of fire to anti-armor firepower.

When combined with long-range precision-fires, the goal will be multiple layers of lethality against enemy armor before a direct-fire engagement. This will ensure that detection means death before an enemy can engage with direct-fire weapons. The goal is to reduce casualties and provide a higher operational tempo for U.S. military forces against the militaries of major powers.

This goal is enabled by Joint connectivity through JADC2 that enables massive data-gathering through all shooters partnering with Joint ISR assets and swarms of unmanned ground vehicles (UGVs) and UAS. With the aid of artificial intelligence and machine learning, this data turns into actionable information rapidly disseminated to commanders. A commander can then choose to act on the new information to engage an enemy unit with fires or indirect-fire weapons possessed by nearby armored units.

A logical sequence for understanding this concept is as follows:

1. Joint connectivity created through the JADC2 network;
2. Shooters, Joint ISR assets and UGV and UAS swarms feed the JADC2 network with massive amounts of data;
3. Rapid analysis and dissemination of intelligence, aided by artificial intelligence and machine learning, provides information to commanders at mission speed;
4. Judgment by commanders in the loop as to whether to use force;
5. Indirect-fire by armored units or long-range precision fires; and
6. Enemy unit destroyed.

Figure 1. A Russian UGV based on the BMD armored chassis. Russia's armed forces will likely integrate UGVs with motor rifle battalions because of the Ministry of Defense's "Weapons Robotizing 2015" program.

However, as retired COL John Antal concluded, "Precision strikes that are not backed up with a continuous battle of decisive maneuver are merely artillery raids set out to punish, not defeat, an opponent."[8] This is an important reminder and caution for the tactic of massed, precision-guided fires proposed in this analysis. Attrition while in a battle of signatures does not necessarily lead to victory. That requires a broader all-domain operation and decisive action.

Understanding current anti-armor materiel for ABCT

It is important to understand current U.S. military anti-armor capabilities before offering recommendations for new materiel. To begin, direct-fire antitank firepower for U.S. military forces currently includes Javelin missiles; tube-launched, optically tracked, wire-guided (TOW) 2 missiles; an Abrams MBT's M256 120mm tank gun; and the M242 Bushmaster 25mm cannon on Bradley Fighting Vehicles (BFVs).

The Javelin missile has a maximum range of 4.5 kilometers.[9] The TOW 2 missile's range is 3.75 to 4.5 kilometers.[10] The BFV's M242 cannon has an effective range of two kilometers and can penetrate the armor of many armored vehicles it will encounter, including some MBTs.[11] As for an Abrams' main gun, M829A3 Armor-Piercing Fin-Stabilized Discarding Sabot with Tracer (APFSDS-T) projectiles are the current large-caliber projectiles used to destroy enemy heavy armored vehicles.[12] These projectiles have an effective range of three kilometers.[13] However, given the classified nature of modern MBT armor,[14] it is unknown how many APFSDS-Ts are needed to defeat a modern MBT. That said, the first Gulf War shows that a single APFSDS-T regularly defeats older tank designs, such as the T-72, T-72M and T-72M1, from any angle.[15]

The Javelin missile is a fire-and-forget weapon allowing for mobility immediately after launching the missile. This compares to TOW-2 missiles that require Soldiers to aim at a target until the missile strikes.

Figure 2. A Battle Group Poland U.S. Soldier participates in Javelin ATGM training near the Bemowo Piskie Training Area during Saber Strike 17 June 11, 2017. *(U.S. Army photo by Charles Rosemond, Training Support Team Orzysz)*

As for the monetary cost of these anti-armor weapons, the fiscal year (FY) 2018 unit cost for a Javelin missile was $206,705.[16] The FY18 unit cost for a TOW 2 missile was $83,381.[17] The next-generation M829E4 depleted uranium APFSDS-T costs $13,061.58 per unit as of FY17.[18]

Lastly, as a point of reference, the Air Force plans to purchase Small Diameter Bomb IIs to destroy moving targets. The unit cost of this ordnance as of December 2015 was $243,000.[19]

New long-range precision fires are in development to achieve parity or superiority against other major powers in terms of technology. First, there is the Extended Range Cannon Artillery program that will increase the range of the M109 Paladin 155mm self-propelled howitzer from 30 kilometers to 70 kilometers.[20] This will allow precision-guided 155mm projectiles to perform the same role as more expensive precision-guided rockets and missiles. Future hypersonic precision-guided munitions may push this capability out to 100 kilometers.[21] There is also a new anti-armor 155mm artillery round being procured in the BONUS antitank artillery projectiles, each armed with two

precision-guided top-attack antitank munitions.[22] [23] Another solution for defeating armor with tube artillery is the in-development precision-guided 155mm Cannon-Delivered Area Effects Munition (CDEAEM).[24]

Next, the Guided Multiple-Launch Rocket System (GMLRS) guided rockets have a range of 70 kilometers. GMLRS-guided rockets can use an area-fires alternative warhead, which affects as large an area (0.23 square kilometer)[24] as earlier sub-munition-equipped rockets.[25] Thus, the M270 Multiple Launch Rocket System can strike an area of around a square kilometer. To extend the range of U.S. guided rockets against near-peer guided rockets, there is a program to acquire the tail-controlled GMLRS guided rocket, a next-generation guided rocket that can hit stationary targets at a range of up to 136 kilometers.[26] Current GMLRS-guided rockets have a unit cost of $129,226 in FY18.[27] This cost is less than a Javelin missile.

New materiel needed to enable concept

There is a need for deploying weapons on U.S. MBTs and IFVs that can destroy armored targets with indirect fires. One way to do so is by arming U.S. armored vehicles with longer-ranged ATGMs. Another course of action is to develop rounds fired from MBT cannons that can destroy enemy armored targets with indirect fire.

An interim solution is to arm Abrams tanks and BFVs with ATGMs mounted on a remote turret to provide anti-armor indirect fire. An ATGM tank destroyer – such as those in development by Poland, created using the hull of the Armored Multi-Purpose Vehicle (AMPV) – could serve this role or provide extra volume of fire when needed for Abrams and Bradleys. Such an AMPV variant may be much faster to deploy than a next-generation combat vehicle that replaces the Bradley or Abrams.

Two ATGMs may be useful in the role of providing indirect fires to current armored vehicles: the Hellfire missile and the United Kingdom's Brimstone missile.

Hellfire missiles have a direct-fire range of seven kilometers, an indirect-fire range of eight kilometers and a minimum range of .5 to 1.5 kilometers.[28] Longbow Hellfire missiles use a millimeter-wave radar guidance, and Hellfire II missiles use laser guidance to destroy enemy armored vehicles with an antitank warhead.[29] These missiles had a weapon-system unit cost of $94,997 per missile (all variants) in FY18.[30] Hellfire missiles cost less than half as much as shorter-ranged Javelin missiles. Thus, given that the Javelin missile is an effective means of destroying enemy armor, then Hellfire missiles represent a superior, though vehicle-mounted, anti-armor capability at a lower unit cost.

Figure 3. U.S. Army soldiers load an AGM-114 Hellfire missile on an AH-64E Apache helicopter in Kunduz, Afghanistan. The Joint Air-to-Ground Missile will replace Hellfire. *(U.S. Army photo by CPT Brian Harris)*

Brimstone missiles are the United Kingdom's version of the Hellfire.[31] With a range of more than 40 kilometers, Brimstone II missiles have a much longer range than Hellfire missiles. They also possess both millimeter-wave radar guidance and laser guidance.[32]

One drawback to the use of Hellfire or Brimstone missiles will be a limited number of shots before a crew needs to reload the missile launchers with the very heavy (roughly 100 pounds) missiles.[33] [34] Another drawback of this idea is the .5 to 1.5 kilometer minimum range of the Hellfire missile, which means that Hellfire missiles would best be used in combination with the Javelin missiles used by infantry deployed with U.S. IFVs, which have a minimum range of 150 meters.[35] TOW-2 missiles have a minimum range of 65-200 meters.[36] Thus, a combined-arms approach that uses all three ATGMs will allow troops with lightweight equipment to strike enemy armor from 65 meters to seven to eight kilometers.

A longer-term materiel solution is to create a Bradley replacement that has the flexibility to mount a variety of missile or drone launchers on either side of its turret in addition to a 50mm cannon. This could be like the flexible missile platform developed by Moog. This will allow the use of Brimstone missiles, Hellfire missiles, TOW-2 missiles and Javelin missiles by the Optionally Manned Fighting Vehicle while providing a capability for the use of Coyote drones and Stinger missiles for air defense.[37]

As for the Abrams replacement, a future MBT could fire precision-guided rounds able to defeat enemy armored vehicles with indirect fire. This would need to be a precision-guided armor-defeating projectile that can fire out of a battle tank's main gun. Essentially it is a smaller version of the in-development 155mm CDAEM.[38]

However, indirect projectile fire by battle tanks will require installing new targeting systems on all MBTs to allow precise indirect fire, installing cannons on new battle tanks that can elevate higher than the current 20 degrees[39] and including the Advanced Field-Artillery Tactical Data System (AFATDS). AFATDS is the fire-support command-and-control system employed by U.S. Army and U.S. Marine Corps units to provide automated support for planning, coordinating, controlling and executing fires and effects.[40] Also, the right mix for each type of round in battle tanks will require simulations and wargames to determine.

Organization, training, leadership, personnel and facilities

Because of the nature of this proposal, the organization of tank companies and mechanized-infantry companies is unchanged. I propose adding a tank-destroyer platoon to the headquarters and headquarters company of all armored battalions and mechanized-infantry battalions. Each tank-destroyer platoon will include three sections of two tank destroyers each, providing flexibility for the battalion commander to attach, assign or use them independently of the battalion's tank or mechanized-infantry companies. This new tank-destroyer platoon will be a fires battery, not unlike the current mortar platoon in the role of direct-fire support to front-line forces.

Training for the crews of armored vehicles will need to include the use of indirect-fire weapons, including ATGMs and certain projectiles fired from a battle tank's main gun. Gunners of all armored vehicles will need training in how to hit targets beyond line of sight. Battle-tank commanders will also need training on using AFATDS, leaving other crew to perform their respective roles of driving, loading and gunnery.

Leaders at all levels will need training on how to quickly ascertain and take advantage of short-lived opportunities to destroy enemy units with indirect fires. This training cannot be lopsided toward field-grade officers with a more informed view of the battlefield. Mission command will require initiative by all levels of command. However, the use of force will need a streamlined kill-chain process with rapid authorizations as needed. This is especially true in a contested electromagnetic-spectrum environment.

This tactic should not require new tank crew or IFV crew members. That said, this proposal requires a new military-occupation specialty for tank-destroyer crew members and officers. If tank destroyers have three crew members (driver, commander and gunner), there will need to be 12 more Soldiers per headquarters and headquarters company of each armored battalion and mechanized-infantry battalion. This assumes no need for more logistical personnel. Given there are 16 ABCTs with three maneuver battalions each,[41] this will require adding another 576 Soldiers to the U.S. Army.

Facilities will need ranges for tanks large enough to provide training for gunnery using indirect fires out to a possible 40 kilometers. This will require new ranges simulating a variety of terrains for tanks and IFVs to train.

Caution on protecting armored units

This only drives home the fact that detection on future battlefields means destruction. An important point to make for the protection of armored forces going into the future is to plan for artillery barrages, long-range precision-guided fires and massed cluster or thermobaric munitions against any U.S. armored forces detected by an enemy. This will require a new way of thinking about protection in terms of masking signatures.

Masking is the active and passive ability to make military systems difficult or impossible to identify, locate and target. Masking is more than camouflage and stealth. It employs next-generation active and passive means to reduce the electromagnetic spectrum (EMS) signature to render the system difficult to locate and hard to target. Some of these technologies could include:

- Advanced profile design to lower a vehicle's radar cross-section and reduce its thermal, electronic and acoustic signature;
- Low-tech, passive systems such as next-generation camouflage netting;
- Color-changing materials and radar-absorbing paint;
- Intelligent, multispectral camouflage systems to rapidly blend a vehicle into its surrounding EMS background;
- Decoys and portrayal of false actions and locations;
- Cognitive electronic-warfare systems employing machine learning to counter the enemy's radars;
- Electronic jamming to protect the emissions of friendly communications and electronic systems against enemy detection;
- Electronic-warfare support measures and signals intelligence; and
- The use of electronic countermeasures and digital radio-frequency memory to hide beneath the blanket of enemy or friendly jamming.[42]

Figure 4. An example of blending: a Japan Ground Self-Defense Force Type73 Ougata light truck camouflaged into its surrounding background.

There will be a requirement for such measures for the foreseeable future to provide protection for armored vehicles. Masking signatures could become more central to the survival of armored vehicles than even armor plating as the raw lethality of war increases. The alternative is to turn to costly attrition warfare using extremely large ground forces as occurred in both world wars.

Conclusion

This article analyzed the changes in DOTMLPF needed to improve ABCT combined arms. The crux of this concept is through Joint connectivity provided by JADC2. Massive amounts of data gathered by all shooters to partner Joint ISR assets and swarms of UGVs and UAS lead to rapid analysis with the aid of artificial intelligence and machine learning. This results in the rapid dissemination of actionable intelligence to commanders at mission speed. A commander can then choose to act on the new information to engage an enemy unit with fires or indirect-fire weapons possessed by nearby armored units.

Central to this concept is new materiel that will allow both anti-armor direct fire and indirect fire from all battle tanks and IFVs. Armored vehicles aided by new tank destroyers must also play a role.

That said, the future of precision-guided ordnance presages a broader question: "How will precision-guided weapons change the future of war?"

For instance, is the invention of precision-guided weapons like the invention of the rifle – something that changes warfare slowly at first but that dictates the battlefield later? The rifle was able to attack strategic targets using snipers and to harass troops from relative safety. However, it rapidly changed warfare as it became ubiquitous and technology evolved, causing very different battlefields to be only a few decades apart. The evolution of warfare from the American Revolution to the Civil War and through World War II shows this.

The cutting edge of modern war since World War II is arguably the precision-guided munition. This includes advanced air defenses able to reach the stratosphere, to ATGMs, to bombs that increase the lethality of fixed-wing aircraft by orders of magnitude. Even modern anti-access/area-denial technologies are ultimately the result of advancing precision-guided ordnance (often bombs or rocket motors). Modern war has changed inexorably with the invention and evolution of precision-guided munitions, although directed-energy weaponry, cyberwarfare, space superiority, information warfare and networks such as JADC2 may give the precision-guided munition a run for its money in the 21st Century.

A further consideration is that precision-guided weapons are another tool for commanders among many, yet which will eventually need their own unique doctrine as a decisive arm of warfare. An example would be the invention of heavy cannon. Heavy cannons excelled at the ancient task of penetrating the walls of fortifications and by offering powerful defensive capabilities. Later, as their size, expense and weight decreased, cannons evolved into various types of field artillery such as the mortar and howitzer. They became weapons that eventually accounted for the most battlefield casualties in land warfare and have highly refined doctrine.[43]

Another consideration is whether the invention of precision-guided weapons is like the invention of firearms: something that forever changes every way in which war happens – ways that were poorly predicted – over a very long period. From the cannon to the harquebus to the musket to the rifle to the machinegun, war was never the same after the invention of the firearm, although it took centuries for firearm technologies to mature.

Regardless, continued innovation among all components of DOTMLPF will be decisive for present-day commanders facing a time of great uncertainty as to what warfare may look like in just 20 years.

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Notes

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Acronym Quick-Scan

ABCT – armored brigade combat team
AFATDS –Advanced Field-Artillery Tactical Data System
AMPV – Armored Multi-Purpose Vehicle
APFSDS-T – Armor-Piercing Fin-Stabilized Discarding Sabot with Tracer
ATGM – anti-tank guided missile
BFV – Bradley Fighting Vehicle
CDAEM – Cannon-Delivered Area Effects Munition
DoD – Department of Defense
DOTMLPF – doctrine, organization, training, materiel, leadership and education, personnel and facilities
EMS – electromagnetic spectrum
FM – field manual
FY – fiscal year
GMLRS – Guided Multiple-Launch Rocket System
IFV – Infantry Fighting Vehicle
ISR – intelligence, surveillance, reconnaissance
JADC2 – Joint All-Domain Command and Control
MBT – main battle tank
TOW – tube-launched, optically tracked, wire-guided
UAS – unmanned aerial system
UGV – unmanned ground vehicle