

Sustainment Innovation for Multi-Domain Battle

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After years of conducting counterinsurgency operations centered on forward operating bases (FOBs), the Army and Marine Corps have introduced a new operational concept to operate, fight, and campaign successfully in the 2025 to 2040 time frame. The concept, called “Multi-Domain Battle: Evolution of Combined Arms for the 21st Century,” is generating discussion across the joint logistics enterprise. Its focus is how sustainers can best support U.S. forces in tomorrow’s combat.

The future operational environment is expected to challenge forces with multifaceted dilemmas. These dilemmas include facing adversaries with similar or better capabilities and operating on a battlefield where freedom of action cannot be guaranteed.

In the complex Multi-Domain Battle (MDB) environment, near-peer competitors will challenge U.S. supremacy across all domains (land, air, maritime, space, and cyberspace). Sustainment formations will have to support large-scale combat operations characterized by distributed, semiautonomous brigade combat team (BCT) operations that are enabled by echelons-above-brigade formations in contested terrain and across all domains.

Army sustainers must consider how best to respond to the sustainment challenges of this new MDB fight. Most sustainment leaders and Soldiers have a wealth of counterinsurgency operations experience, and while those lessons are valuable, the future fight requires new ideas and solutions. Sustainers need to broaden their aperture and proactively re-

spond to the future with an appetite for innovation in order to respond to the increasingly complex and challenging security environment.

The Combined Arms Support Command (CASCOM) is analyzing the sustainment implications of how the Army will fight in the future. The Army must develop leaders, design organizations, develop doctrine, and provide materiel solutions that will enable Soldiers to fight when they are out-manned, out-gunned, decentralized without connectivity, in an expeditionary environment, maneuvering against a peer competitor, and holding only temporary or periodic domain superiority.

CASCOM, as the Army’s sustainment think tank, must drive innovation with new ideas, new devices, and new methods at every available opportunity in order to optimize the delivery of sustainment effects.

Semi-independent BCTs

A key element of the MDB concept is that of resilient formations featuring BCTs capable of operating semi-independently for up to a week without continuous resupply. Currently the brigade support battalion (BSB) holds 2 ½ days of supply.

In the new MDB environment, BCTs will be required to operate more independently and with fewer logistics constraints. In order to achieve the goal of seven days of supply, the Army must either triple the BSB’s capacity or change the way sustainers provide support.

Dispersed Operations

The MDB concept describes adversary anti-access/area denial (A2/AD) capabilities that can contest U.S. forc-



The Combined Arms Support Command is figuring out how Army sustainers can best respond to the sustainment challenges of the new Multi-Domain Battle fight.

es across all domains, from predeployment to employment. The concept changes the age-old assumption that the U.S. military will have overmatch in any domain during battle.

This overmatch, which had allowed the Army to concentrate forces and establish large sustainment hubs, will easily be eliminated by peer competitors with aerial and surface long-range precision fires and other kinetic effects.

To mitigate MDB threats, the Army will require a combination of current and new ways of operating. In this MDB fight, U.S. forces must be able to combine traditional methods of camouflage and concealment with new techniques, such as “cyberflag.” The Army must also consider a greater dispersion of forces and resources, which means logisticians must provide timely sustainment over greater distances.

In the future, BCTs will operate across larger areas using smaller, more decentralized units. Support areas across the battlefield will be vulnerable to enemy interdiction and must operate in a mobile, dispersed manner. The new expanded battlefield will require forces to reduce their electromagnetic spectrum signature using resilient mission command systems.

The force cannot assume unhindered access to space, cyberspace, and electromagnetic spectrum capabilities that are critical for current mission command systems to function effectively. Current systems that depend on assured communications and access to space capabilities must be adapted to conduct offline operations. Furthermore, operating dispersed over extended distances will increase vulnerability to cyberattack and disrupt the integrity of near-real-time data.

Finally, the joint force must develop greater countermeasures to protect against cyberspace threats, which if left uncontested will degrade reconnaissance, mission command systems, position, navigation, and timing.

Spider Web Sustainment

MDB requires an evolution in military logistics that applies global supply chain best practices in the context of the unique characteristics of the future fight. Simply stated, the battlefield is no longer linear; therefore, the supply chain can no longer be linear.

One concept to sustain MDB is spider web sustainment. Spider web sustainment is a complex web of logistics modes, nodes, routes, and suppliers that employ both old and new methods. It is also an acronym that stands for self-sufficient units, precision logistics, interoperability with partners, distribution, expeditionary sustainment, regional resources, widely dispersed, enabled mission command with enterprise resource planning, and brigade-focused.

This web creates multiple sustainment options, which provide more responsive and flexible sustainment solutions for the warfighter. Spider web sustainment evokes the independent, yet connected, and resilient strands of an actual spider web.

Current sustainment techniques, including Army pre-positioned stocks, operational contract support, and industrial partnerships, must continue to be integrated into the support plan. What must change are considerations for procuring and securing regional resources, developing alternate distribution methods, and executing precision logistics.

MDB requires a highly mobile and adaptive logistics infrastructure that is capable of responding to sustainment requirements. No longer can the Army establish static FOBs fed by a linear supply chain. Consideration must be given to the mission command necessary to execute spider web sustainment. Force structure modifications for sustainment commands are necessary in order to develop methods to enable fluid sustainment mission command across the battlefield.

RSOI in the Future

The future A2/AD threat requires

forces to fight rapidly and transition quickly from strategic movement to tactical maneuver. Movement must mirror maneuver, and expeditionary forces must be able to respond in days, not months. These requirements will have a significant impact on reception, staging, onward movement, and integration (RSOI) operations. The continued investment and innovation in Army watercraft and joint strategic lift must allow for the impacts of moving combat configured forces.

In today's more permissive environments, typically all phases of RSOI occur within the theater of operations, from the port of debarkation to the tactical assembly area. In future nonpermissive environments, most phases of RSOI may have to occur within the strategic support area.

Until the A2/AD threat can be neutralized, the ability to conduct administrative strategic movement is compromised. Therefore, forces, equipment, and even munitions must be strategically moved or maneuvered together and prepared for rapid employment.

Demand Reduction

Operating semi-independently at the BCT level clearly presents challenges to sustainment; the level of demand will outweigh the Army's current ability to provide resources throughout the new battlefield. Demand reduction must be a guiding principle that is employed across the force. The military must look to (or lead) industry in developing new and innovative science and technology to reduce BCT consumption.

Consequently, CASCOM has prioritized its science and technology efforts. The development of technologies to produce supply at the point of need reduces distribution requirements, allows for more self-sufficient BCTs, and mitigates risk to sustainment forces over extended lines of communication.

CASCOM is currently pursuing science and technology advance-



A joint tactical autonomous air resupply system carries a small package during the Maneuver Fires Integrated Experiment at Fort Sill, Okla., on April 12, 2017. This technology offers sustainers the possibility of using unmanned aerial systems to deliver supplies on the battlefield. (Photo by Monica Wood)

ments such as additive manufacturing (3-D printing), alternative sources of water, and alternative sources of energy. As these innovative solutions are fielded, the requirements for materiel to be distributed will lessen, as will the BCT's dependence on echelons-above-brigade sustainment forces.

Expeditionary Sustainment

MDB will require a sustainment enterprise that can sustain forces over great distances in austere environments. The Army will no longer have the luxury of static FOBs and "iron mountains" of materiel for sustainment.

The spider web sustainment concept will provide the framework for future sustainment operations, but materiel development and investment will enable sustainers to operate in a mobile, redundant, and dispersed manner while retaining access to supplies and equipment.

Through greater investment in joint sustainment capabilities, such as strategic lift, pre-positioned stocks, and interoperability with sea basing, the Army can achieve greater expeditionary sustainment capability. Future sustainment nodes must be present within multiple domains, not simply on land.

Consequently, the Army must continue to improve its watercraft capabilities to deliver combat configured forces ready to fight. The Army is currently pursuing the maneuver support vessel (light) to provide this capability.

Atop the CASCOM science and technology priority list are autonomous distribution systems, both aerial and ground. Autonomy as an enabler is a necessary capability that provides the advantages of unit dispersion, distribution over extended distances, and prolonged endurance across all domains.

Autonomous and semiautonomous

distribution capabilities will increase freedom of action for both the supported and supporting force. These technologies enable increased resupply throughput, reduce the number of required drivers, and increase force protection by reducing risk.

One type of technology being pursued is cargo unmanned aerial systems, including the joint tactical autonomous air resupply system (JTAARS). The JTAARS is a joint initiative with the Marine Corps that provides scalable autonomous lift capabilities to dispersed forces. It is projected to be in use within the next 10 years. This method of distribution provides precise resupply at the point of need and enables semi-independent operations.

Precision Logistics

The dynamic nature of the MDB fight changes the variables of sustainment and drives the need for precision logistics. Precision logistics

is the accurate delivery of essential supplies and equipment to the right place at the right time and in the right quantity throughout the contested battlespace.

For precision logistics to succeed in the future, it requires innovation coupled with consideration of supply chain threats. The contested MDB supply chain will force sustainers to use new and innovative methods to operate with precision.

For example, it may involve predictive analytics that could redirect JTAARS to resupply widely dispersed, highly mobile forces. Sustainers may need to deliver goods using small drones that have the ability to reroute to a mobile customer.

Of course, the enemy creates additional variables that the Army must consider when distributing supplies to mobile customers. The complex environment will require maximized use of distribution platforms, especially over extended lines of communications.

Artificial Intelligence

A shared understanding is essential for mission command, which is paramount in the contested and degraded MDB operational environment. The Army is actively working to converge its networks in order to develop a comprehensive common operational picture (COP).

Converging the networks creates greater security and synchronization across the joint force. The sustainment aspect of the COP must incorporate the innovative application of artificial intelligence in order to improve the precision and velocity of sustainment.

CASCOM's leading artificial intelligence initiative is predictive analytics. Technology advancements will allow predictive analytics within platforms to automatically populate the sustainment COP in order to enable commanders to see real-time readiness indicators and predict future sustainment requirements. Sustainment systems improved with artificial intelligence tools will rev-

olutionize forecasting and logistics decision support tools, making those tools integral to the COP.

An example of the powerful effects of convergent technology is a sustainment COP informed by condition-based maintenance plus technology that autonomously diagnoses system failures and places parts on order with minimal human intervention.

Future Sustainment Training

As innovation drives changes, sustainers must adjust the way they train. Training must drive thoughts and actions beyond past conflicts to prepare for future engagements. Training philosophy and methods must change to incorporate realistic challenges of operating with degraded capabilities in multiple domains. More importantly, future training must build sustainment planners, leaders, and Soldiers who can support the force in an ever-changing, degraded, and lethal environment.

Enhanced training requires an investment in training environments that will improve competency in expeditionary decentralized operations. CASCOM is working with the Army Reserve, the Army National Guard Bureau, the Forces Command, and First Army to improve the design and increase the rigor of sustainment training during warfighter exercises, command post exercises, combat training center rotations, and other collective training events.

Sustainment leaders and Soldiers must be prepared for enemy contact from fort to foxhole. Therefore, support units must become more lethal and develop capabilities to become generators of security, not merely consumers. Sustainment forces will need to develop new tactics, techniques, and procedures to execute sustainment for semi-independent BCTs.

Training to amass logistics effects where and when they are needed will be necessary to succeed in the future fight. These tactics, techniques,

and procedures must be planned and rehearsed similarly to how maneuver forces execute passage of lines operations.

The sustainment challenges of the future will require changes in doctrine, organization, materiel, and training. CASCOM's goal is to bring new ideas and innovation to these areas.

CASCOM is leading the Army's effort to develop innovative sustainment capabilities, doctrinal changes, and training initiatives. The command's Sustainment Battle Lab is currently developing a white paper called "Sustaining Multi-Domain Battle" and welcomes the sustainment community to provide recommendations, additions, and contributions to sustainment innovation for the future.

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