Soldiers from 5th Battalion, 4th Air Defense Artillery Regiment fire a Stinger missile from the Maneuver Short Range Air Defense (M-SHORAD) system on 7 October 2021 at a Bundeswehr range on the Baltic Sea coast of Germany. (Photo by Maj. Robert Fellingham, U.S. Army)

Once More unto the Breach

Air Defense Artillery Support to Maneuver Forces in Large-Scale Combat Operations

Col. Glenn A. Henke, U.S. Army

In William Shakespeare's *Henry V*, the titular king motivates his army on two memorable occasions. The second occasion is the famous Saint Crispin's Day speech: "We few, we happy few, we band of brothers."[1] The first instance invokes the speech from which this article takes its title. The 1989 Kenneth Branagh film adaptation portrays this scene as an event in which most are eager to participate following the king's speech, despite the steep odds against them as they attack a determined defender: "Once more unto the breach, dear friends, once more."[2] The air defense artillery (ADA) branch currently finds itself reattacking ground it previously held as it determines how to support maneuver forces in a multidomain fight with divisions as the primary unit of action. This requires a critical look at command relationships and authorities, the role of Maneuver-Short Range Air Defense (M-SHORAD) and the Integrated Air and Missile Defense Battle Command System (IBCS) supporting corps and divisions, and how best to train and equip ADA forces for large-scale combat operations (LSCO).[3] The task to reintroduce air defense capability into a multidomain Army occurs amid the backdrop of a growing experience gap; the captains who deactivated the divisional SHORAD batteries are now colonels, and their senior NCOs are almost all retired. As a result, branch leaders must develop the capability as part of an integrated learning campaign to inform immediate outcomes at the unit level while simultaneously supporting critical combat development activities impacting Army 2030.

The experience gap is also an opportunity to look at the challenges of ADA support to maneuver forces with fresh eyes. This perspective is critical, since the tactics and procedures from the 1990s and early 2000s may not be entirely suitable on a battlefield with a proliferation of air threats that diminishes the utility of broad categories like short-range and high-altitude systems. The further development and fielding of the IBCS makes the SHORAD and high-to-medium air defense distinctions even less meaningful. If this article argues anything effectively, it is that ADA support to maneuver is much greater than the creation of SHORAD units organic to divisions and instead involves nearly the entire ADA portfolio of weapons systems. From a training perspective, this will be most visible in the Mission Command Training Program (MCTP) exercises for corps and division commanders supported by ADA brigades, as well as the Roving Sands series of exercises conducted by 32nd Army Air and Missile Defense Command (AAMDC).

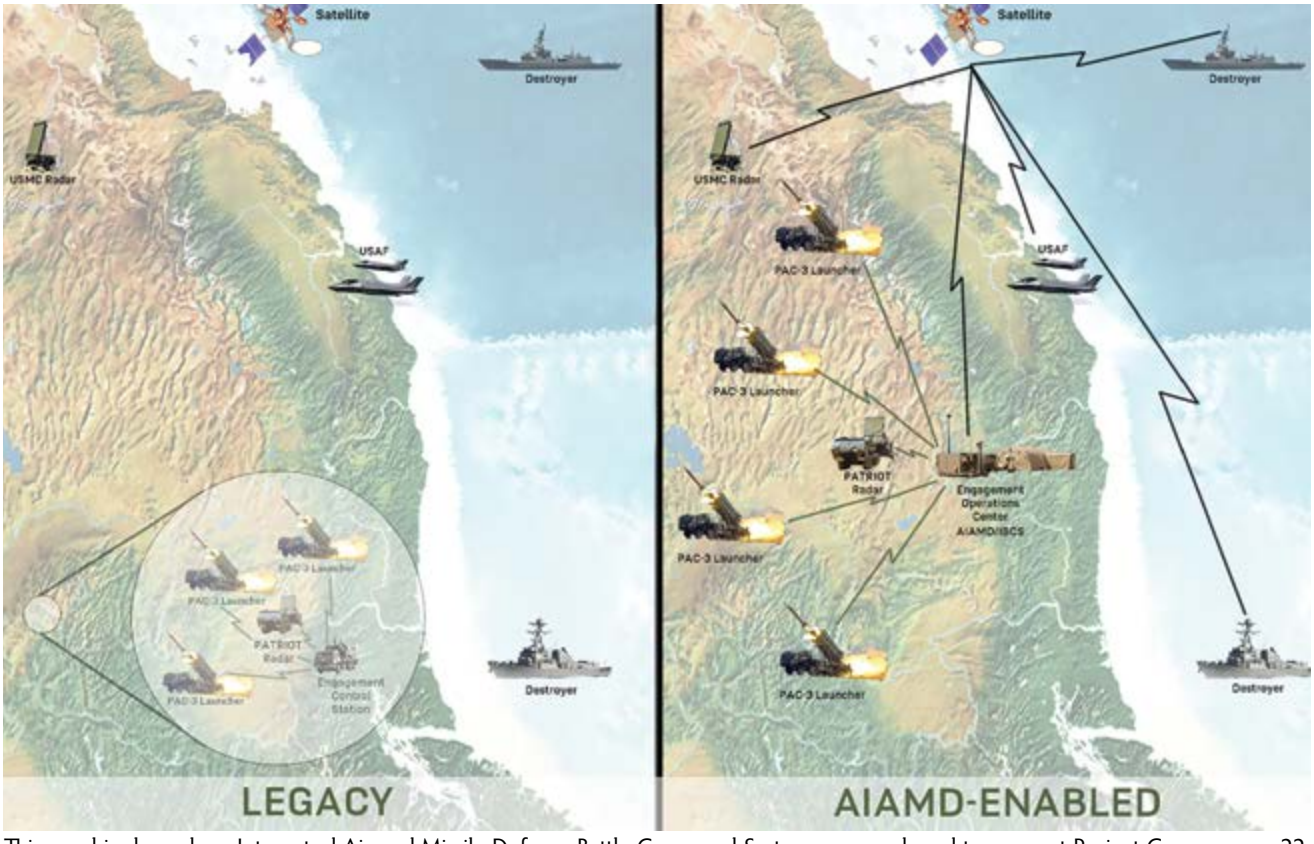
A final opportunity presents itself in how the branch leverages the training approaches of the past two decades that have enabled sustained operations across the globe. The ADA branch has sustained continuous readiness by forward-stationed units, maintained an enduring rotational presence in the U.S. Central Command area of responsibility since 1991, and generated ready units for global employment without interruption. While most of these missions have been fixed or semifixed site defense, much of what the branch knows can be applied or used as the starting point for support to the multidomain fight the Army envisions.

My ultimate purpose is to support discussions among experienced professionals who may disagree on how to address the challenges presented. Although this article makes recommendations that may not be adopted, I will judge this effort a success if the work that follows informs and supports the debates leading to the ultimate solutions.

Part 1: Fighting the Air and Missile Threat in LSCO

Command, support, and authorities. One of the most critical tasks in any military operation is establishing the relationships that enable commanders at echelon to successfully execute their assigned missions. These include the normal command relationships (operational control [OPCON] and tactical control [TACON], primarily) and support relationships (direct, general, etc.). For ADA units, a discussion of command relations (COMREL) must also include the authorities granted within the joint force commander's area air defense plan (AADP). The combination of command relationships,

Col. Glenn A. Henke is the deputy commanding officer of the 32nd Army Air and Missile Defense (AMD) Command. His recent assignments include commander of the 35th Air Defense Artillery Brigade; CJ38 AMD Division chief for U.S. Forces Korea and Combined Forces Command; and assistant chief of staff, G-3, 32nd AMD Command.

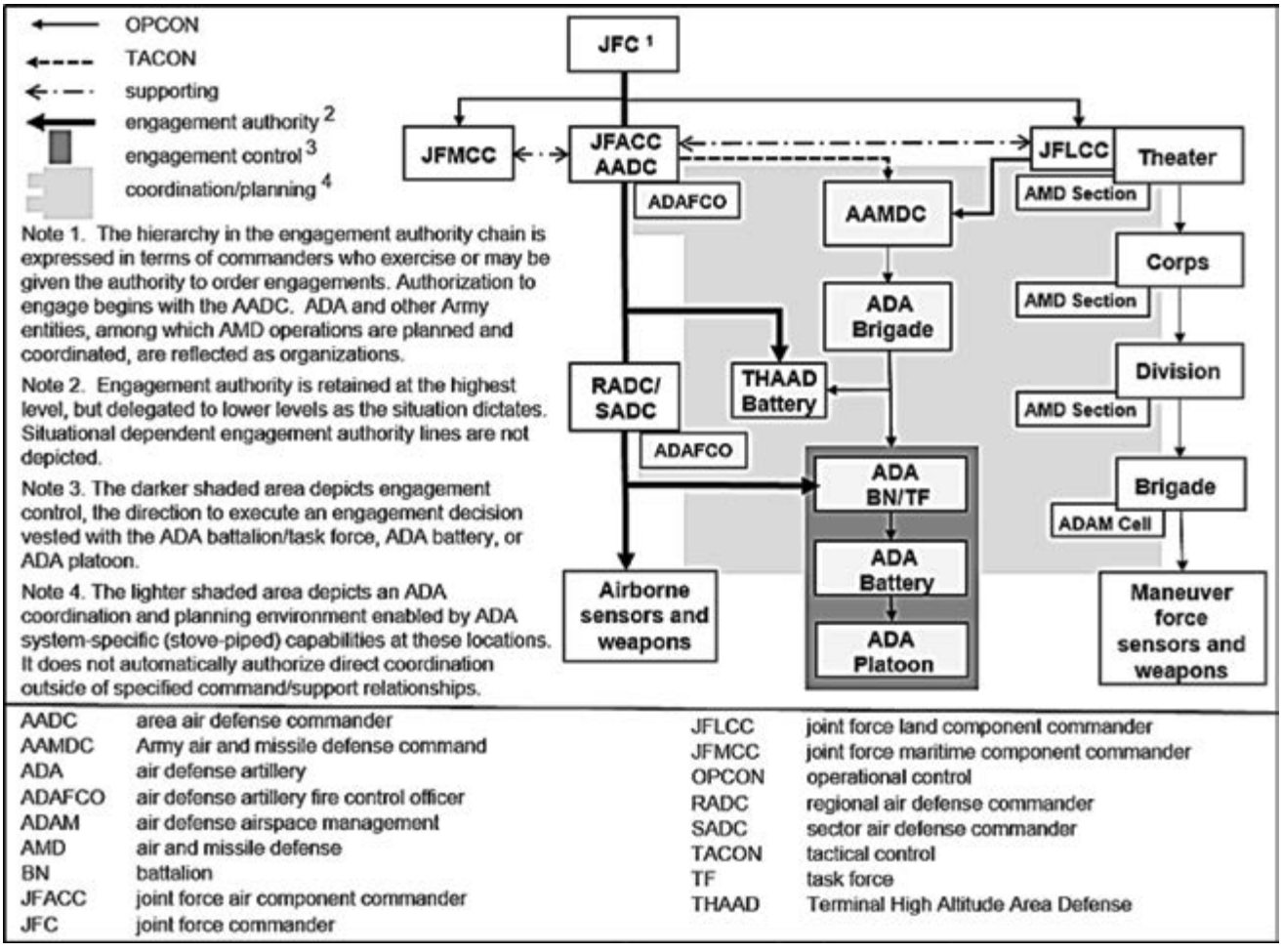


This graphic shows how Integrated Air and Missile Defense Battle Command System was employed to support Project Convergence 22, hosted by Army Futures Command at Yuma Proving Ground, Arizona, from 19 September to 18 October 2022. Project Convergence is the Army's campaign of learning, experimentation, and demonstration aimed at aggressively integrating the Army's weapons systems and command and control systems with those of the rest of the joint force. (Graphic courtesy of the Air and Missile Defense Crossfunctional Team, Army Futures Command)

support relationships, and AADP-granted authorities establishes the framework for decision-making and is in most cases the single most important part of any plan. Experience shows that leaders with the right authorities and a firm understanding of the commander's intent will be more successful than equally talented leaders operating under overly restrictive or unclear command and control structures.[4]

Existing doctrine described in Field Manual (FM) 3-01, *U.S. Army Air and Missile Defense Operations,* provides a useful starting point for describing a COMREL structure that enables ADA commanders to achieve their missions within the existing joint constructs.[5] The joint nature of the air defense mission is a critical factor and must be addressed in exercises when ADA brigades support maneuver forces to avoid building unrealistic expectations in what division and corps commanders can expect from their air defenders as well as understanding their own authorities.

The structure described in FM 3-01 places the AAMDC as OPCON to the coalition forces land component commander (CFLCC) and TACON to the combined forces air component commander (CFACC). The TACON relationship is typically for the purposes of controlling ADA fires (see figure 1, page 71). Although not described in doctrine, the AAMDC may also be in direct support of the CFACC. Since the CFACC is doctrinally (and in general practice) both the area air defense commander and the supported commander for air and missile defense, an explicit command relationship between the AAMDC enables the CFLCC to meet the requirements of the joint force commander. The ADA brigades are in turn OPCON to the AAMDC, with fire control coordinated and controlled through the air defense artillery fire control officers (ADAFCO) collocated with a U.S. Air Force Control and Reporting Center (or similar organization). This structure varies by theater, most



(Figure from Field Manual 3-01, *U.S. Army Air and Missile Defense Operations*, December 2020)

Figure 1. Theater Air and Missile Defense Command Relationships

notably on the Korea Peninsula, but the basic structure generally remains in place at the theater level.

During Roving Sands 22 as well as recent MCTP Warfighter exercises, the ADA brigade was placed OPCON to the corps commander, deviating from Army doctrine. While this was primarily done to facilitate exercise design and minimize the need for a robust AAMDC High Command response cell, it had two effects that hampered execution. First and most critically, it divorced the ADA brigade from the theater fight by effectively severing links to the joint structures that execute AMD operations. Second, it created expectations with maneuver commanders that they have a freer hand than joint operations will usually provide during real-world operations. Given the difficulty in imagining a scenario where the CFACC would not be the supported commander for air and missile defense, this omission is a significant shortcoming and rather questionable from the perspective of joint doctrine. As a result, this should be avoided in training.

The use of support relations provides an effective way to bridge this gap. The CFLCC can place specific ADA brigades into direct support of a corps commander while maintaining the OPCON link to the AAMDC. This enables the AAMDC to execute and synchronize the theater AMD fight while ensuring the corps commander has the air defense support required to enable their own mission accomplishment. From a practical perspective, the differences between TACON and direct support are negligible for ground-based units. This is not necessarily true for capabilities operating in the air or maritime domains, which could explain the general reluctance of those component

The U.S. Army conducted a successful intercept test with the Integrated Air and Missile Defense Battle Command System 12 December 2019 at White Sands Missile Range, New Mexico. (Photo by Luke Allen, U.S. Army)

commanders to rely on support relationships when receiving or providing support.

Since joint doctrine is extant, meaning that it describes the accepted and agreed practices for joint operations, it functions somewhat differently than Army doctrine. Army doctrine provides a significant degree of flexibility to drive change in how the Army fights; this is not the function of joint doctrine. As a result, Army capabilities like ADA that are closely integrated with joint mission areas (like air defense) must operate within the construct of joint doctrine. The joint counterair framework cannot be overlooked for the convenience of exercise design. This requires a firm appreciation for the AADP by Army leaders, as well as an appreciation by the CFACC and joint force commander for the authorities required by Army units.

The discussion of authorities described in the AADP becomes critical when it relates to fire control of ADA forces supporting maneuver units. In general, maneuver commanders require permissive fire control for SHORAD forces and are best served by local engagement authority for unmanned and rotary wing threats below the coordinating altitude. This requires explicit delegation of engagement authority to local commanders codified in the AADP since the coordinating altitude does not by itself provide engagement authority. The protection of ground forces will require commanders to assume risk to friendly unmanned platforms when those systems are operating in a manner consistent with hostile criteria. This is less of a challenge for Patriot units as well as IBCS-enabled units that can engage well above the coordinating altitude and are already tied to the ADAFCOs and the joint fire control structure. While existing SHORAD platforms have limited ability to engage above commonly used coordinating altitudes, this will not always be the case, and therefore, fire control must be included in the organizational design of these units. The wide adoption of IBCS as the mission command platform provides a potential solution to this problem, given the flexibility of the system. Regardless of platform, all these authorities must be outlined explicitly in the AADP, and the Army would be well served to ensure future iterations of Joint Publication 3-01,

Air defenders from 5th Battalion, 4th Air Defense Artillery, conducted a culminating field training exercise with both their legacy Avenger and new Maneuver Short Range Air Defense systems at Grafenwoehr Training Area in Germany, 17–21 October 2022. (Photo courtesy of 10th Army Air and Missile Defense Command)

Countering Air and Missile Threats, communicate these requirements to the joint force.

Another critical requirement for both maneuver and ADA commanders is positioning authority. Like engagement authority below the coordinating altitude, this cannot be assumed since AADPs in practice often withhold this authority at the theater level. While this approach has merit when ADA units are exclusively focused on a theater-level defended asset list (DAL), this is overly restrictive when ADA units are defending a corps or division-level DAL. This also points to the need for the AADP to explicitly establish the authority for CFLCC subordinate commanders to establish their own local DAL without a requirement for CFACC approval. The AADP must establish the authority for positioning these units by the supported maneuver commander or the ADA commander in direct support. While all of this is consistent with existing joint doctrine, an AADP for a LSCO fight requires more detail in the AADP (usually within an authority's matrix) than is currently practiced in training and current operations. At a minimum, AADPs and orders for MCTP exercises and Roving Sands should explicitly define these authorities.

Brigades supporting corps and divisions. The theater structure described in the previous section should serve as the starting point for routine support to MCTP exercises and Roving Sands. To recap, this structure would place an ADA brigade in direct support to a corps with OPCON retained by the AAMDC. While the current doctrine is in no way comprehensive, nor does it cover the numerous variations that may arise, the approved Army doctrine should at least serve as the starting point for exercise design. While some maneuver commanders may desire to exercise OPCON of all capabilities supporting them, this direct support arrangement is hardly unprecedented in our previous and current operating environments. This structure will likely continue as the Army leverages capabilities following COMREL to other combatant commanders, such as U.S. Cyber Command and U.S. Space Command. Fortunately, Army doctrine on

support relationships provides supported commanders considerable authority over supporting units in the accomplishment of their missions, and ADA units are no different.

In addition to the COMREL, an ADA brigade supporting a corps-level MCTP exercise requires an exercise AADP with sufficient authorities to achieve mission success, as also described in the previous section. This requirement for authorities in the AADP also applies to SHORAD units assigned to maneuver units. The exercise AADP must address engagement authorities of local commanders, the authorities inherent below the coordinating altitude, and positioning authority.

Once a workable framework for decision-making is established for the exercise, a credible threat is required to drive the commander's training objectives. As the OPFOR units at the combat training centers have demonstrated for decades, Army units challenged by dynamic and thinking enemy forces will achieve higher levels of proficiency than units fighting a less aggressive or capable foe. The replication of the air and missile threats is no different, and the emerging operating environment provides numerous examples of how our adversaries may employ capabilities to defeat or disrupt Army forces. For training purposes, corps and divisions should encounter a threat that can employ increasingly accurate ballistic missiles, cruise missiles, groups 1-3 UAS, along with traditional rotary and fixed-wing threats.[6] These threats should be replicated and appropriately moderated in federated simulations with corresponding effects adjudicated against training units. If the Nagorno-Karabakh conflict of 2020 and ongoing hostilities in Ukraine are any indicators, these threats should be replicated regardless of whether the unit has dedicated ADA units to counter them, though to varying degrees based on the training unit's ability to defeat them.

One argument against presenting a realistic threat, particularly when ADA capabilities are lacking, is that this would prevent the corps or division commander from achieving their training objectives during MCTP exercises. It is unlikely our adversaries will see this the same way. A realistic threat will also drive the changes the Army has already identified as critical to success in multidomain operations, to include camouflage, command post disaggregation, and other passive defense measures. A "pushover" threat will not help build the combat proficiency required by Army forces. A moderated threat can be dialed up or down to drive training objectives and ensure units address all four pillars of air defense, particularly when a supported unit lacks active defense capabilities. Since some of the systems with the capability to defeat these threats prior to launch reside at the theater level, corps and divisions will also gain training on how to leverage required joint capabilities.

> "A 'pushover' threat will not help build the combat proficiency required by Army forces."

The return of ADA brigades and eventually M-SHORAD battalions to MCTP exercises provides the branch an opportunity to validate and refine doctrine as commanders and their staffs solve the military problems that unfold during the exercises. One example of this is where air defense as a mission belongs within the framework of warfighting functions (WfF). Staffs continue to struggle with the confusion stemming from the ADA branch as part of the Fires Center of Excellence while the air defense mission resides in the protection WfF. The question of whether the mission "belongs" to a given WfF is only problematic if one takes a dogmatic view of WfFs as a construct. The WfFs are a means to organize missions and associated functions, and the Army tends to be more practical regarding these matters, particularly for well-understood capabilities. The lack of a "maneuver" cell or comparable working group in a division headquarters demonstrates this practicality. Likely, units conducting MCTP exercises will develop

new practices that enable mission success, and the WfFs will eventually sort themselves out. Through this evolutionary process, we may determine whether a protection working group structure facilitates the air defense mission or restricts it too narrowly. Commanders of ADA brigades and battalions supporting these exercises play a critical role in building this understanding and establishing best practices.

Corps and divisions executing MCTP exercises will need dedicated education on fighting with ADA units as part of the leader training program along with the organized academic sessions that precede a Warfighter. This is also true for brigade combat teams executing combat training center (CTC) rotations with ADA formations. Just as today's ADA colonels deactivated their batteries and platoons, many of today's brigade commanders last trained with SHORAD forces as lieutenants and captains. TRADOC continues to refine precommand courses, particularly phase 2 that focuses on warfighting, and these revisions should include dedicated discussions of air defense as a mission and ADA as a capability. Part of this education at all levels should include the earlier discussion on COMREL and authorities.

ADA brigade commanders will need to deliberately train their staffs to support maneuver commanders during MCTP exercises. The Roving Sands exercises held by 32nd AAMDC provide a CTC-like experience that trains brigades and battalions to execute sustained field operations in support of a maneuver fight. Since Roving Sands is only held every two years due to the complexity and scale, only one in four Forces Command (FORSCOM) ADA brigades will have this training experience in a two-year Roving Sands cycle. Aside from the training opportunities that may arise from the joint exercise program, ADA brigades require home-station training scenarios that challenge staffs and provide commanders the means to assess their formations. The MCTP team provides leader training as part of the exercise cycle, and most divisions and corps conduct a series of command post exercises that precede the Warfighter. These events will continue to provide the best training opportunities for ADA brigade commanders and their staffs. For contingency operations, the FORSCOM ADA brigades entering a Global Force Management Allocation Plan response-force mission period will continue to execute a culminating training event supervised by the 32nd AAMDC. The scenarios for these events must evolve to ensure that units are prepared for global employment as the operating environment evolves.

Integrating maneuver SHORAD. Prior to the Army's transformation to brigade combat teams as the primary unit of action, divisions had assigned SHORAD battalions. Batteries habitually supported specific brigades in a direct support role, while the battalion commander and staff supported the division (G staff) headquarters. The battalion S-2 (intelligence officer) supported G-2 analysis of air threats, the S-4 (logistics officer) advised the G-4 on missile allocation and parts, and the S-3 (operations officer) worked with the G-3 for plans and operations. Additionally, each SHORAD battalion provided a small cell in the division G-3 to support plans and operations, a precursor to current Air Defense Airspace Management (ADAM) cells. In this way, a SHORAD battalion commander had responsibilities equivalent to the AAMDC commander's responsibilities to the CFLCC as theater army air and missile defense coordinator. In most cases, the ADA battalion commander was dual hatted as the division air defense officer.

As the Army rebuilds divisional SHORAD capacity with M-SHORAD units, these battalion commanders will resume these traditional roles while supporting MCTP exercises and CTC rotations alongside their division-level counterparts. These division-level responsibilities require the branch to look at how it develops battalion commanders and field grade officers since none of these officers have direct experience with a pre-transformation divisional structure. Just as Baron von Steuben advised on the careful selection of NCOs in the Continental army, the selection and development of M-SHORAD battalion commanders is a task that cannot be overestimated in importance.[7] This training program would benefit from sending selected commanders as observers to CTC rotations and MCTP exercises. Much of the course work for ADAM cells is also applicable and can be integrated into precommand training.

Another talent management challenge will be sourcing observer controller/trainers (OC/T). The ADA branch has long recognized the need to select high-performing officers and NCOs for duty at the CTCs and MCTP. Given the projected growth of the branch in the coming years and the associated demands

Soldiers practice assembling the Mobile Low, Slow, Small Unmanned Aerial Vehicle Integrated Defense System outside of Camp Buehring, Kuwait, 22 January 2022. (Photo by Spc. Damian Mioduszewski, U.S. Army)

to fill other critical requirements while also building a cadre of joint-qualified officers eligible for brigade command slating, OC/T duty positions will continue to be challenging fills, particularly at the field grade and senior NCO levels. For officers, this will likely drive the need to focus broadening assignments to the most critical requirements. The NCO corps will have to balance OC/T requirements with other critical fill requirements like drill sergeant and recruiting billets. Given the growth of ADA warrant officer positions and roles since 2003, the branch will also have to look at how this cohort should support CTCs and MCTP manning.

Consistent with the previous discussion on threat representation in MCTP exercises, realistic training demands a credible and lethal threat representation at the CTCs. The advances and proliferation of threat capabilities requires a flexible model that allows the CTCs to modify the threats presented at the speed of relevancy. Home station training will likely be constrained by local airspace restrictions and the ability to replicate threats, so the first real "red air" a soldier might see will likely be at the CTC. An installation-level red air team employing groups 1-2 UAS may partially mitigate this gap by providing critical training opportunities prior to a CTC rotation or overseas deployment. This capability would be beneficial at all installations with MTOE units, not just those with assigned M-SHORAD forces.

Fire control and engagement authority for M-SHORAD forces presents topic for considerable debate as the branch decides how it will design these forces and the supporting structures. The solution likely lies within a continuum. At one extreme, engagement authority rests with each individual crew, while at the other extreme, all fires are controlled by ADAFCOs. As the defense of the National Capital Region demonstrates, local conditions and risk acceptance levels can drive a high-control solution.[8] Given the anticipated need to operate in a communications-disrupted environment while simultaneously reducing friendly electronic signatures to increase survivability, a distributed fire control is probably more desirable and ultimately more feasible. This reinforces the earlier discussion on the Army's need to favorably shape authorities

described in the AADP. Army Service component commands have a critical role in shaping this discussion with the supporting theater air components, and we have seen recent successes in delegating engagement authorities for the counter-small unmanned aircraft system (C-sUAS) fight. This should also reinforce the need to focus on division ADAM and joint air ground integration center training to shape the airspace control measures required to support divisions. The ultimate fire control solution and authorities must also account for the continued fielding of C-UAS capabilities operated by soldiers outside the ADA branch. The ADA branch will likely remain the proponent for training and certification of C-UAS platforms regardless of who operates them.

The future fielding of IBCS-enabled units drives additional tactical considerations, given the inherent flexibility of the system to integrate multiple sensors and effectors. Experimentation has already shown how IBCS can integrate joint sensors; conceivably, an IBCS-enabled M-SHORAD battalion could have attached Patriot launchers and IBCS fire control network nodes receiving joint sensor tracks (e.g., F-35) defending a division-level asset. A system as flexible as IBCS in turn requires a fire control model that provides equal flexibility to maximize the weapon system effectiveness. Further joint experimentation is critical in developing this model.

The fielding of M-SHORAD units to divisions will take place over many years, and in the interim, corps, division, and maneuver brigade commanders will continue to rely on their ADAM cells. Based on available ADA officers and warrant officers, these cells are currently undermanned across FORSCOM. The growth of M-SHORAD battalions will further stress the ability to align talent with ADAM cells. Each new M-SHORAD battalion has the same number of ADA captain authorizations as the ADAM cells in one and one-third divisions, and enough ADA warrant officer authorizations to zero out all but one slot in a division. These talent management challenges come as division and brigade commanders become increasingly reliant on their ADAM cells to integrate the unit air picture into the joint air pictures and emerging C-UAS capabilities, as demonstrated by recent experiences by maneuver commanders supporting Operation Inherent Resolve and Ukraine support operations.[9] The 108th ADA Brigade has piloted an ADAM cell mentorship program with XVIII Airborne Corps units to bridge this gap and assist maneuver commanders in adapting to the emerging operational environment. Based on the successes and positive feedback from the commanders of the supported corps and divisions, the 32nd AAMDC will expand this program to other FORSCOM units in the coming year. ADAM cells could also benefit from broader exposure to MCTP exercises and Roving Sands in an observer or guest OC/T role.

Part 2: Training and Equipping ADA Units for LSCO

Training and mission essential task lists. A comprehensive view of ADA unit training is a precondition in preparing for large-scale combat operations. The challenge facing the branch is determining how we modify our training while still preserving the best practices that have allowed us to generate sustained readiness over the past few decades. Additionally, the branch must determine how an IBCS-enabled force should train, given the tremendous flexibility in task organization the system enables. Since IBCS fielding is expected to take nearly a decade, the branch has an opportunity

Infantry Battalion METL (IBCT)

1. Conduct Area Defense
2. Conduct a Movement to Contact
3. Conduct an Attack
4. Conduct an Air Assault
5. Conduct Area Security
6. Conduct Expeditionary Deployment Operations at BN level

ADA Battalion METL (Patriot)

1. Conduct Air and Missile Defense Operations
2. Conduct Expeditionary Deployment Operations at BN level

(Figure adapted from HQDA METLs, Army Training Network)

Figure 2. Infantry Battalion and Patriot Battalion METL Comparison

Conduct Air and Missile Defense Operations Task Summary

AAMDC (Task 44-EAC-8040)
1. Conduct Air and Missile Defense theater level planning.
2. Commander serve as the Deputy Area Air Defense Commander (DAADC) when designated.
3. Execute AMD operations.
4. Provide theater AMD coordination teams and liaison forces to the appropriate Joint Operations Area (JOA) elements.
5. Protect systems and capabilities in the JOA.
6. Adjust air defense coverage.

Brigade (Task 44-BDE-8040)
1. Plan air defense.
2. Coordinate air defense.
3. Integrate air defense assets in accordance with the Area Air Defense Plan (AADP).
4. Adjust air defense coverage.

Battalion (Patriot) (Task 44-BN-8040)
1. Battalion XO leads staff to plan air defense.
2. Coordinate airspace control activities with join and subordinate air defense fire units.
3. Provide Early Warning (EW) to supported assets.
4. Utilize weapon systems capabilities to provide AMD coverage to defended asset, protected maneuvering assets, and to protect the force from enemy surveillance, air attacks, and/or ballistic missile threats
5. Protect system and capabilities in the OE.
6. Battalion XO coordinates Battalion sustainment activities.

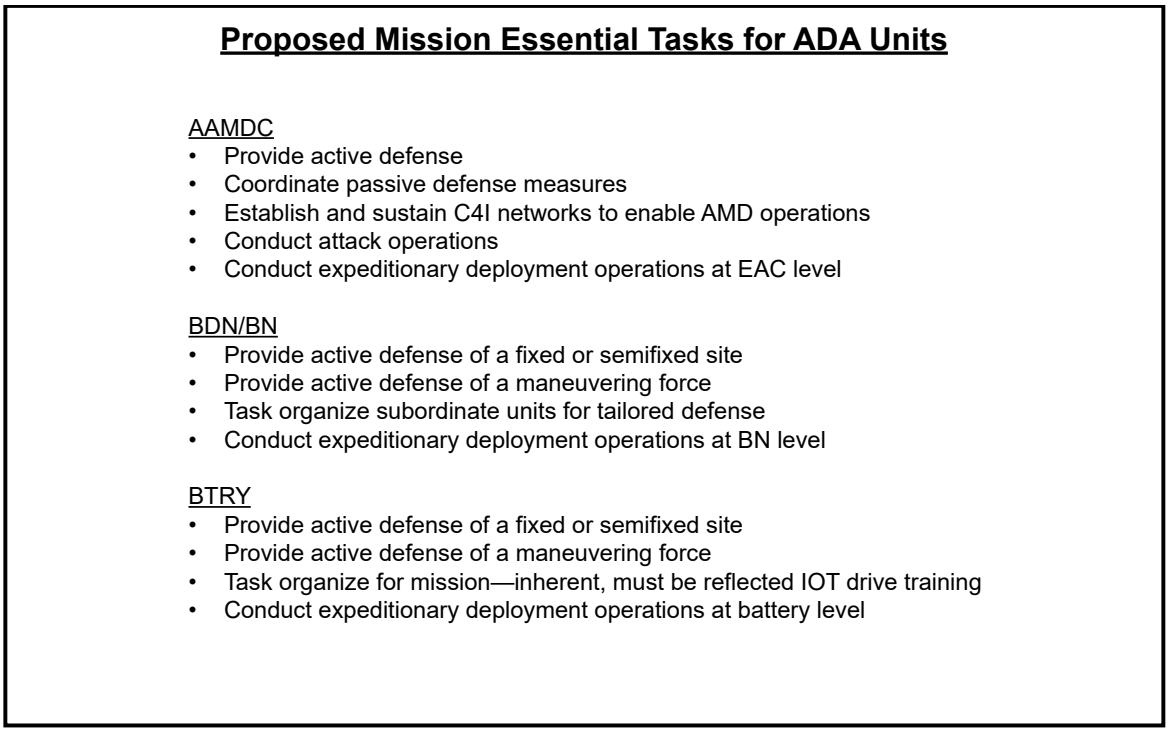
(Figure adapted by author from Training and Evaluation Outlines on the Central Army Registry)

Figure 3. Comparison of Core ADA METL Tasks at Echelon

to iterate training approaches in preparation for the eventual convergence of capabilities.

Army doctrine uses mission essential task lists (METL) to focus training and allow commanders to accept risk in some tasks. The move away from commander-developed METL toward Department of the Army-directed METL allowed standardization across like-units and enabled predictable expectations on what any given unit was trained to do. For ADA units, this standardization has come at the expense of clarity. With only two METL tasks (one of which covers deployment activities), ADA commanders do not have the ability to accept risk on specific tasks since every task described in the supporting training and evaluation outlines is a critical task that must be trained to achieve a "T" in that task. By comparison, an infantry battalion has six METL tasks (see figure 2, page 77). For a Patriot battalion, the single air-defense-related task (Conduct Air and Missile Defense Operations) lists six subtasks, two of which are related to the battalion executive officer and one of which is arguably the responsibility of a brigade or AAMDC commander. Subtask number four covers most of what a Patriot battalion does, but this task does not inform a training strategy and is sufficiently vague to introduce wide interpretations by different commanders (see figure 3).

While the present mission essential tasks may not provide full clarity, the Combined Arms Training Strategy (CATS) should in theory assist commanders in building workable training plans. Using this approach, ADA units building readiness tend to focus almost exclusively on gunnery and mission-specific culminating training events or mission rehearsal exercises. Assuming a unit also trains on its deployment METL task, a



(Figure by author)

Figure 4. Proposed ADA METLs to Support LSCO

Patriot battalion can achieve T1 (trained) following this approach. Recent experiences at Roving Sands 22 demonstrate that neither the current CATS tables nor gunnery tables incorporate every task required to support maneuver forces. As a result, Patriot battalions may achieve T1, but this does not mean they are trained to support a LSCO fight. This gap creates considerable challenges for commanders trying to accurately describe their readiness and for supported maneuver commanders trying to understand what kind of operations a specific ADA unit can support. ADA operations in a multidomain battlefield are too complex to encapsulate in a single METL task. As a branch, we recognize the difference between conducting fixed site defense and defending maneuver units. Units conducting sustained fixed site defense often execute operational readiness evaluations to validate site crews' ability to provide enduring readiness in a combat zone. The use of operational readiness evaluations is not as easily applied (and may not be relevant) to a unit establishing tactical sites for a short period of time before jumping again to support maneuver commanders. Just as an infantry battalion has multiple tasks to cover the range of missions, a METL that differentiates between these missions enables commanders to accept risk and focus on upcoming missions. A unit preparing to deploy to the U.S. Central Command area of responsibility can accept some level of risk on its ability to support a maneuver force, whereas a unit entering a prepare-to-deploy mission must be prepared for a wider range of operations. Figure 4 details a proposed ADA battalion METL that outlines tasks that specifically address supporting maneuver. This approach would allow commanders to make risk decisions on training programs.

Aside from LSCO requirements, the movement toward an IBCS-enabled force could also drive a different approach to training. Given the inherent flexibility in the task organization for specific missions, the standardized fire unit is no longer a given and may not even be desirable. Unit status reporting (USR) must accurately communicate training and readiness levels, which are in term informed by METL assessments. Should the Army choose to organize IBCS-enabled batteries by capabilities (e.g., sensor battery, effector battery, command and control battery) instead of a standard fire unit design, we will have to become masters of building task-organized battery teams for tailored missions. This will

A Patriot Advanced Capability-3 Cost Reduction Initiative missile is launched during the recent successful Integrated Battle Command System flight test 15 July 2021 at White Sands Missile Range, New Mexico. (Photo by Darrell Ames, U.S. Army)

also make the battalion level the first meaningful measurement of readiness from a USR perspective since the battalion commander would be the commander able to task organize subordinates into combat capable battery teams tailored for the assigned mission. This is not necessarily a change from a USR perspective, since the USR communicates readiness of the "AA" unit identification code (brigade headquarters, battalion, or THAAD battery) to the Army, joint staff, and combatant commanders. It does, however, change how battalion commanders must assess their subordinate units' readiness. Battalions will not only have to measure the readiness of the batteries as organized for USR purposes (i.e., by unit identification code), they will also have to measure the readiness of task-organized battery teams for specific missions to effectively describe a meaningful combat capability. This would also drive what joint force commanders request when asking for forces; instead of requesting a certain number of ADA fire units, they will likely continue to request battalions since the specific capability must be task organized at the battalion level to suit the mission. This will remain a challenge for the joint force during the decade the Army transitions from Patriot to IBCS-enabled units. Although IBCS gives the branch the opportunity to solve tactical problems with smaller organizations, the battalion will likely remain the "coin of the realm" when requesting AMD forces.

Current Patriot Battery Gunnery Tables	Proposed Gunnery Table Progression
Table I (Basic System Skills)	• Individual tasks
Table II (Ready-For-Action Drills)	• Individual tasks common to all
Table III (Basic Air Battle Management/Missile Reload)	• System specific individual tasks (e.g., launcher or radar)
Table IV (Basic Gunnery Certification)	• Crew and team tasks
Table V (Air Battle Management/Missile Reload)	• Crew drills on major end items
Table VI (Prepare for Movement and Emplacement)	• Air battle management
Table VII Commander's Assessment (Precertification to Table VIII)	• Reload
Table VIII (Intermediate-Level Gunnery Certification)	• Conduct equipment masking
Table IX (Alert State Assumption/Ready for Action Drill)	• Collective tasks (battery)
Table XI Commander's Assessment (Precertification to Table XII)	• Prepare task-organized battery team for movement and emplacement
Table XII (Advanced-Level Gunnery Certification)	• Conduct air battle
	• Conduct emissions/signals masking

(Current Patriot Battery Gunnery Tables [*left side*] adapted from Training Circular 3-01.86, *Patriot Gunnery Program*. Proposed Gunnery Table Progression [*right side*] developed by author)

Figure 5. Gunnery Table Progression

With regard to training Patriot and IBCS-enabled units to support LSCO, the current Patriot gunnery framework provides a starting point and, with modifications, can continue to provide the foundational readiness required to accomplish assigned missions. This will require a more explicit focus on individual, team/crew, and collective tasks. One of the author's persistent observations as a battalion and brigade commander is that nearly all battery-level leaders and most field grade officers do not think of training in terms of individual and collective tasks; they think of ADA training almost exclusively in terms of gunnery tables. Individual training is often viewed as separate from ADA training, covering common soldier tasks or mandatory training. This drives a centralization of training at the battery level since the first measurable readiness objective is the battery Table VIII. This mindset will not enable the flexibility needed for an IBCS-enabled force, no matter how the Army decides to organize these battalions. Therefore, it is helpful to reframe the gunnery tables as a progression of individual to collective tasks, with particular emphasis on certifying crews on major end items separate from a collective battery-certification event. An IBCS-enabled battalion with batteries organized by equipment type will absolutely demand this approach since the battery collective training event will not describe an employable and discrete combat capability from the perspective of the joint force employing these capabilities. Should the Army retain the fire unit model, this progression model will allow units to realize the flexibility of IBCS by allowing fully certified elements (e.g., launchers or radars) to plug into a task-organized unit. The modified gunnery tables would first address individual tasks, then crew and team tasks, and culminate in collective tasks (see figure 5). The battalion would also need to be able to validate that a task-organized battery is prepared to execute their mission, prompting the need for a battalion-driven collective training event.

This also leads to a critical analysis of the current advanced gunnery tables, which in theory should inform commander's assessments of T levels in assigned METL tasks. Presently, the advanced tables are almost entirely divorced from measuring readiness as reported in USR. While many leaders believe in the merit in conducting Table XII, we have not been able to describe a measurable readiness impact aside from more proficient crews. In other words, we agree we should do it, but we can't quantify what we get from it. We also lack a dedicated table for units fighting in an autonomous mode. Given the demonstrated capabilities to contest the electromagnetic spectrum presented by our most challenging strategic competitors, we must assume that units will fight in a communications-denied environment, which will prevent them from communicating with ADAFCOs. Finally, the advanced tables could be used to more explicitly describe how to achieve "T" in the METL task. This assessment tends to be more qualitative in practice, and while recent efforts to create "Objective T" proved problematic, a more quantifiable assessment criteria based on training can greatly assist commanders assessing readiness.

Given the anticipated electromagnetic-contested environment, unit training will need include operating under electronic attack. It will also need to enable the ability to build flexible crews to support likely task organization options inherent in IBCS enabled units. In addition to air battle training, units will need to be

proficient at how to support a maneuver force in the attack or defense. Another critical task is to enhance maintenance training to account for the flexibility of IBCS that may change current "fix or fight" criteria, given the anticipated geographic dispersion from battalion-level systems maintainers in a LSCO fight.

with a contested communications environment, disaggregating command posts may also require that we disaggregate functions when reliable communications are infeasible. Ongoing development of the IBCS-fire control command posts will certainly inform the ADA branch's answer to this question. The ultimate solution

It is hardly controversial to suggest that tent-based command posts are ill-suited for LSCO.

Commanders will execute all this while simultaneously building depth in their crews. Given the tremendous opportunity costs of the current Table XII model, the branch must carefully develop a gunnery structure that does not detract from gaining proficiency on what are sure to become fundamental requirements in the operational environment.

Equipping ADA units for LSCO. The future battlefield envisioned by Army leaders drives some equipping considerations beyond the core combat systems undergoing development, testing, and eventual fielding. The ability of enemy forces to detect U.S. systems through signals intelligence, geospatial intelligence, measurement and signature intelligence, and imagery intelligence is already driving Army leaders to reconsider command posts, networks, and camouflage. This section will briefly discuss equipping considerations beyond the major end items associated with IBCS, M-SHORAD, and Indirect Fire Protection Capability (IFPC).

It is hardly controversial to suggest that tent-based command posts are ill-suited for LSCO. In 2022 FORSCOM convened a command post summit with all corps, division, and direct reporting unit commanders, and the unanimous consensus was that command posts must be mobile, masked, and distributed. While discussion of command post modernization tends to focus on the physical structures, the electronic communications infrastructure supporting the command post drives significant timelines associated with emplacement and movement. Units must have the ability to emplace and displace networks quickly and without extensive infrastructure configurations. When combined must ensure the entire staff is accounted for and where they should optimally reside on the battlefield. A disaggregated command post structure must remain sustainable, which necessarily requires a comprehensive organizational assessment. Roving Sands 22 demonstrated the numerous challenges an ADA brigade headquarters faces when employing a tactical command post.

ADA units must also operate on the same mission command systems used by maneuver units. During Roving Sands 22, the 11th ADA Brigade received Command Post Computing Environment (CPCE) to integrate with the 1st Armored Division, which was acting as III Armored Corps. Since CPCE has limited compatibility with the legacy Command Post of the Future systems included in our organic mission command system packages, CPCE was the only way the unit could share mission command data with the supported maneuver unit. The subordinate ADA battalions did not receive CPCE, which limited their ability to communicate with the ADA brigade headquarters. While FORSCOM is advocating for accelerated CPCE fielding for 32nd AAMDC units, an enterprise-level solution is required when those units deploy to support ADA brigade headquarters assigned to European Command and Indo-Pacific Command.

The anticipated operational environment also requires a reassessment of camouflage systems. At some point in the past twenty years, these items disappeared from modified tables of organization and equipment (MTO&E, documents that authorize units' staffing and equipment). While the authorizations for camouflage systems remain on common tables of allowance

(documents that allow items not on an MTO&E) and can therefore be procured, this does not allow the Army to assess supply (S-level) readiness. Additionally, the removal of these systems from the MTO&E also reduced unit organic lift requirements, leading to a reduction in tactical vehicles. It remains to be seen whether a Patriot battalion has the capability to transport all the required camouflage systems, assuming they have them, while supporting maneuver forces. Returning camouflage to the unit MTO&E will allow commands to measure S-level readiness impacts, as well as forcing a reassessment of lift requirements.

Conclusion

As many senior branch leaders have observed in the past few years, there has arguably never been a better time to be an air defender. This is certainly gratifying for those leaders who witnessed the divesture of divisional SHORAD during transformation. The Army fully recognizes the importance of its capabilities in the emerging operational environment. The evolving C-UAS fight has focused the attention of maneuver commanders, and those with recent operational experience in Iraq and Europe have become vocal supporters of the need to address these challenges comprehensively. This trend will certainly increase as MCTP exercises and other training opportunities evolve to ensure Army forces are ready to meet the challenges ahead of us.

The fielding and integration of M-SHORAD battalions is a necessary step but not sufficient to ensure Army maneuver forces can fight and win on a multidomain battlefield. As the branch proved in Operation Iraqi Freedom, nearly all ADA capabilities have a critical role to play in supporting LSCO. This requires the branch to take a holistic view of how it should support these fights. The Army and the joint force have changed significantly since 2003, and the air defense concepts optimized for earlier eras and older Army operating concepts will undoubtedly need adjustment to meet new challenges. These are significant tasks, which include shaping the practical application of joint doctrine to ensure Army ADA forces can have the necessary effects, an enterprise-wide look at training and exercises to reintroduce the entire ADA portfolio of capabilities to the maneuver force, and fundamental unit design activities to ensure that future capabilities can be employed to maximum combat effectiveness.

The branch will execute these tasks while sustaining global operations and continuing to build ready forces for no-notice deployments. Additionally, the branch will begin modernizing Patriot units once IBCS completes testing and achieves initial operating capability. The Regionally Aligned Readiness and Modernization Model will allow FORSCOM ADA units to execute this transformation during the eight-month modernization window, followed by a collective training period and then a mission phase. This will require units to rapidly modernize the materiel as well as the organization and training, which suggests the need to leverage as much existing knowledge as possible in our training approaches while making the required changes to maximize the effectiveness of IBCS-enabled units. Put simply, the branch must reinvent these units quickly and immediately prepare them for deployment.

Experienced leaders will likely disagree on the best approach to address the specific challenges associated with providing comprehensive air defense to maneuver forces. While the disagreements will not be as fierce as the combat we prepare for, there is certain to be strong opinions and passionate debate on the solutions. This debate is critical to the branch's learning campaign since the Army will undoubtedly iterate on these solutions as we determine what works best. Just as Shakespeare's version of King Henry V exhorted his army to "Hold hard the breath and bend up every spirit to his full height," we must enter this debate energetically, and every air defender should be excited to contribute to this effort.[10] ■

Notes

1. William Shakespeare, *Henry V*, ed. Barbara A. Mowat and Paul Werstine (New York: Simon & Schuster, 2020), 225.

2. Ibid., 325.

3. The Integrated Air and Missile Defense Battle Command System (IBCS) will replace the Army Patriot's current command and control system and in time will control most U.S. Army air defense artillery systems. IBCS enables new sensor-to-shooter kill chains through a self-healing network that provides increased flexibility not available to Army commanders.

4. This statement is the author's summary of the broader lessons described throughout Army Doctrine Publication 6-0, *Mission Command: Command and Control of Army Forces*

(Washington, DC: U.S. Government Publishing Office [GPO], 2019). This document defines the elements of command as authority, responsibility, decision-making, and leadership.

5. Field Manual 3-01, *U.S. Army Air and Missile Defense Operations* (Washington, DC: U.S. GPO, 2020), chap. 4.

6. For a detailed breakdown of the Department of Defense categories of unmanned aircraft systems, see ibid., table 3-1.

7. Friedrich von Steuben, *Regulations for the Order and Discipline of the Troops of the United States: Part I* (Philadelphia: Styner and Cist, 1779), 129, accessed 11 January 2023, https://www.loc.gov/item/05030726/.

8. The National Capital Region is defended by ground-based air defense units as part of Operation Noble Eagle. The authority to engage targets is centralized in a single command center under strict rules of engagement to protect civil aviation.

9. Comment extrapolated from multiple after action reviews and assistance visit trip reports for Operation Inherent Resolve and Ukraine support missions.

10. Shakespeare, *Henry V*, 147.

Glossary

AADP	area air defense plan
AAMDC	Army Air and Missile Defense Command
ADA	air defense artillery
ADAM	air defense airspace management
ADAFCO	air defense artillery fire control officer
AMD	air and missile defense
CATS	Combined Arms Training Strategy
CFACC	combined forces air component commander
CFLCC	coalition forces land component commander
COMREL	command relations
CPCE	Command Post Computing Environment
CTC	combat training center
C-sUAS	counter-small unmanned aircraft system
C-UAS	counter-unmanned aircraft system
DAL	defended asset list
FORSCOM	Forces Command
IBCS	Integrated Air and Missile Defense Battle Command System
IFPC	indirect fire protection capability
LSCO	large-scale combat operations
MCTP	Mission Command Training Program
METL	mission essential task list
M-SHORAD	maneuver-short range air defense
MTO&E	modified table of organization and equipment
OC/T	observer coach/trainer
OPCON	operational control
G-2	intelligence officer (division level)
S-2	intelligence officer (brigade level and below)
G-3	operations officer (division level)
S-3	operations officer (brigade level and below)
G-4	logistics officer (division level)
S-4	logistics officer (brigade level and below)
SHORAD	short range air defense
TACON	tactical control
THAAD	Terminal High Altitude Area Defense
TRADOC	Training and Doctrine Command
UAS	unmanned aircraft system
USR	unit status reporting
WfF	warfighting functions