

再次衝向突破口

防空砲兵部隊在大規模作戰行動中支援戰鬥部隊*

Once More unto the Breach: Air Defense Artillery Support to Maneuver Forces in Large-Scale Combat Operations

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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 multi-domain 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 multi-domain 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

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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.

前言

在威廉·莎士比亞的《亨利五世》劇本中，主角國王（有名無實）在兩次令人難忘場合激勵軍隊，第二次慷慨激昂的演講為聖克里斯日：「我們是少數幾個人，幸運的少數幾個人，我們是一支兄弟的隊伍。」¹本文主標題為引用劇中鼓舞軍心的知名語句，而且在 1989 年肯尼斯·布萊納拍攝的改編電影中，其中一個場景為國王在演講中說道：「再次衝向突破口，親愛的朋友，勇往向前衝吧」，多數人紛紛響應參戰，毫不畏懼將面對堅固防衛之敵。²防空砲兵部隊若要在多領域作戰中有效支援戰鬥部隊（師為主要的作戰行動單位），則須重新評估以往地面火力支援模式，至於相關工作為檢視指揮關係與授權事項、機動短程防空系統、整體防空飛彈暨防禦戰鬥指揮系統（支援軍級與師級部隊），以及防空砲兵部隊因應大規模作戰行動的相關訓練與裝備。³不過，重新將防空能力引進陸軍多領域作戰，當前正面臨經驗傳承落差不斷擴大情況，意即以往師底下的短程防空系統連上尉軍官現在都已官拜上校，而資深士官幹部也幾乎都退伍了。鑒此，防空砲兵領導幹部應致力於發展這種能力並列入整體戰役學習科目，以利單位在取得立即成效的同時，也能支援「陸軍 2030 年計畫」中重要的戰鬥發展項目。

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

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. 整體防空暨飛彈防禦作戰指揮系統 (IBCS) 將取代美陸軍愛國者部隊當前使用的指管系統，因為其能及時管控大部分陸軍防空砲兵系統，而且其所帶來的新式偵打一體擊殺鏈，為藉由自我修復網絡方式來提供陸軍各指揮官前所未有的靈活性。

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).

經驗傳承落差也出現一個以嶄新視角看待防空砲兵部隊支援戰鬥部隊的機會，值得注意的是，從 1990 年代至 2000 年代初的戰術戰法，可能已無法適用於充斥著空中威脅的戰場，這意味著短程及高空火力的實用性將大不如前。再者，整體防空飛彈暨防禦戰鬥指揮系統進一步發展與部署，更讓短程防空系統與中高空防空系統相形見绌。本文主要立論在於防空砲兵部隊對戰鬥部隊的支援，不只是向師提供短程防空的建制火力而已，還涉及整個防空砲兵部隊的武器系統組合。從訓練觀點而言，最明顯的觀察為由防空砲兵旅支援軍級與師級部隊的任務式指揮訓練計畫演習，以及由第 32 陸軍防空暨飛彈防禦指揮部主導的流沙演習。

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 multi-domain 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.

最終我們看到的是，防空砲兵單位採用過去二十年的訓練方法，以維持其在全球各地的戰備能力，而且自 1991 年以來藉由前進部署來保持應變能力，並在中央司令部責任區維持持久性輪調部署，致力於為全球部署打造不間斷的有生戰力。儘管防空砲兵部隊大多數任務為固定或半固定式陣地防禦，但相關經驗應可作為支援陸軍多領域作戰構想的起始點。本文目的旨在支持專家學者間各種因應挑戰的論述，不管本文所提建議是否被採納，只要能在眾多爭論中有所貢獻並促成最終解決方案，則本文的撰寫就算成功了。

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, 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

在大規模作戰行動中因應防空飛彈威脅

一、指揮關係、支援關係及授權事項

在軍事作戰行動中，最關鍵任務之一為建立關係，這讓部隊指揮官可以成功執行所屬任務，這些關係包含正規指揮關係（主要為作戰管制和戰術管制）與支援關係（直接支援和一般支援）。在論及防空砲兵部隊的指揮關係時，須包含聯合部隊指揮官區域防空計畫的授權事項。指揮與支援關係和區域防空計畫的授權事項之結合，將形成決策架構，而且在大多數情況下，這是任何計畫中最重要部分。根據過往經驗顯示，就算一個有才能領導者若面臨處處掣肘或指管架構不明確的處境，其表現將不如做到正確授權與理解上級意圖的一般領導者。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

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 a uthority, responsibility, decision-making, and leadership. 這段文字為作者為參考 ADP 6-0 準則並結合自身經驗所得，該準則將指揮要素區分成授權、責任、決策、領導統御。

understanding their own authorities.

當前「第 3-01 號野戰手冊：美陸軍防空暨飛彈防禦作戰」（以下簡稱 FM3-01 手冊）可提供一個有用的理解起始點，以說明防空砲兵指揮官在當前聯合作戰的指揮架構下，如何有效完成所屬任務。⁵我們在演習中須考量防空任務的聯合本質為一關鍵因素，當防空砲兵旅支援戰鬥部隊時，應避免師長與軍長對防空砲兵部隊抱持不切實際的期望，反而應理解其支援的範圍。

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

FM3-01 手冊所述指揮架構，陸軍防空暨飛彈防禦指揮部可作為盟軍地面部隊指揮官的作戰管制，亦可作為聯合空中部隊指揮官的戰術管制，而戰術管制通常是為了管控防空砲兵單位火力（參見圖 1）。雖然準則並未說明，但從上述指揮關係可知，陸軍防空暨飛彈防禦指揮部可作為聯合空中部隊指揮官的直接支援。就準則（與一般實務）角度而言，聯合空中部隊指揮官身兼兩種職能，分別為區域防空指揮官與受支援的防空暨飛彈防禦指揮官，因此釐清陸軍防空暨飛彈防禦指揮部的指揮關係，將有助於盟軍地面部隊指揮官達成聯合部隊指揮官的作戰要求。防空砲兵旅受陸軍防空暨飛彈防禦指揮部的作戰管制，同時由防空砲兵火力管制官（配屬於美空軍管制報告中心或類似單位）負責火力協調與管制。這種指揮架構在不同戰區可能有所變化，尤其是在朝鮮半島，但在戰區層級的基本架構變化不大。

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

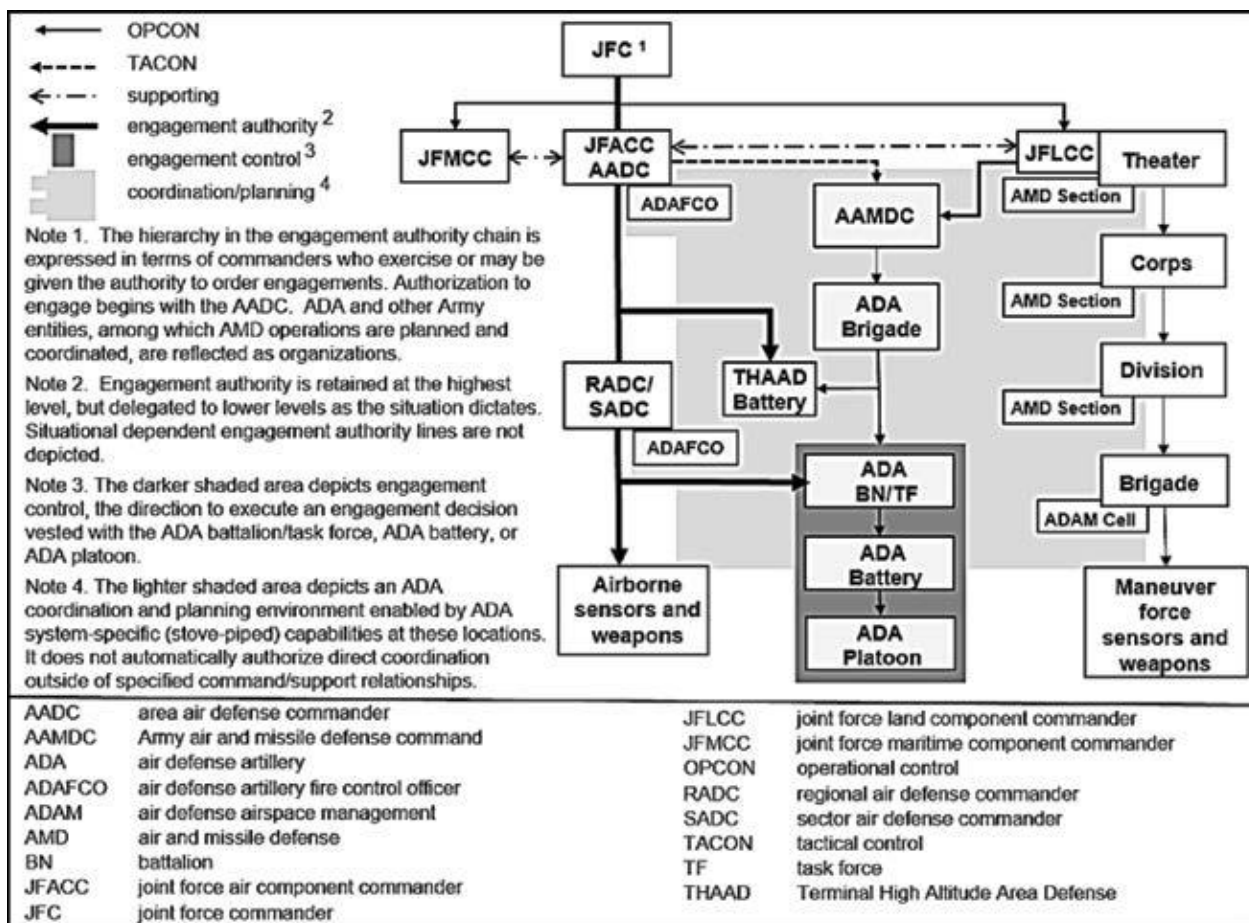
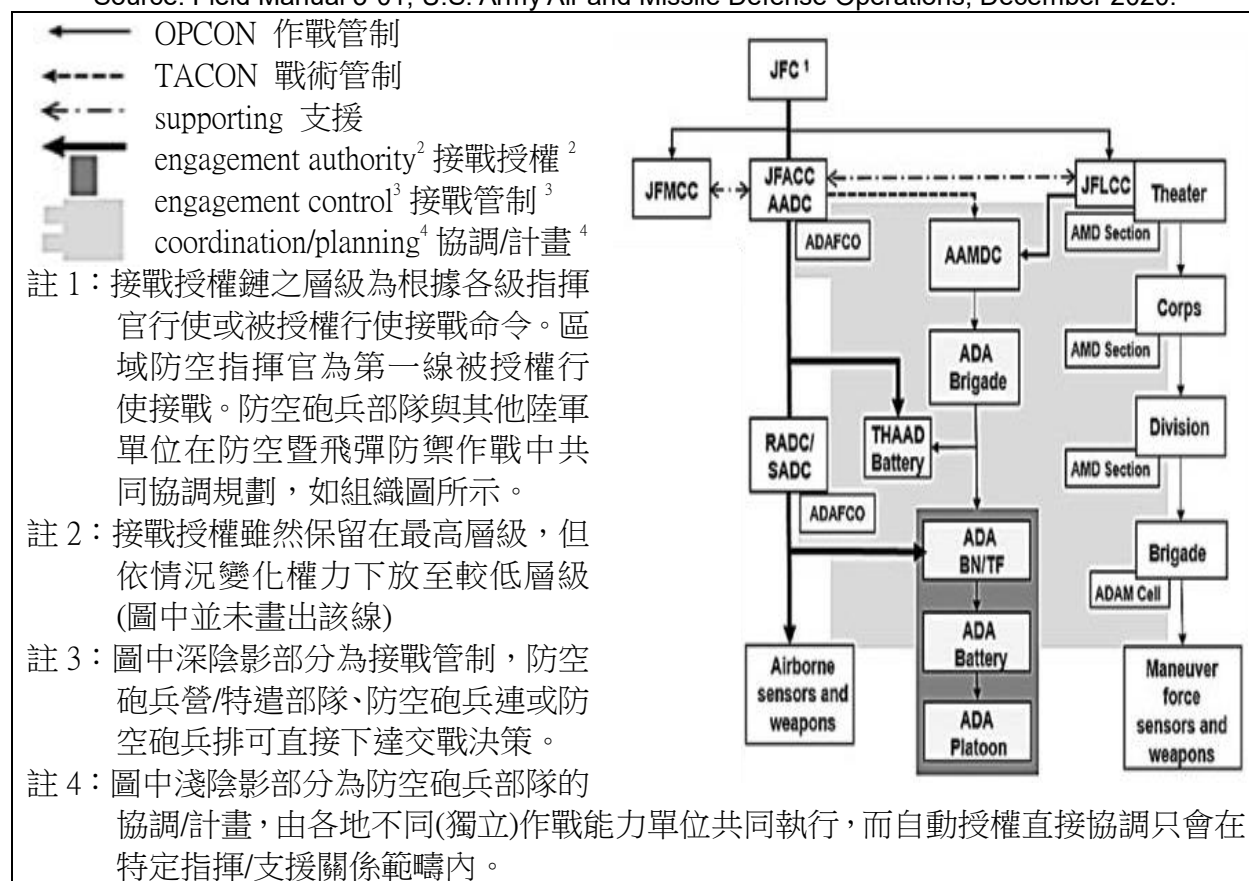


Figure 1. Theater Air and Missile Defense Command Relationships

Source: Field Manual 3-01, U.S. Army Air and Missile Defense Operations, December 2020.



AADC 區域防空指揮官 AAMDC 陸軍防空暨飛彈防禦指揮部 ADA 防空砲兵部隊 ADAFCO 防空砲兵火力管制官 ADAM 防空空域管理 AMD 防空暨飛彈防禦 BN 營 JFACC 聯合部隊空中部隊指揮官 JFC 聯合部隊指揮官	JFLCC 聯合部隊地面部隊指揮官 JFMCC 聯合部隊海上部隊指揮官 OPCON 作戰管制 RADC 地區防空指揮官 SADC 扇區防空指揮官 TACON 戰術管制 TF 特遣部隊 THAAD 終端高空區域防禦	Theater 戰區 Corps 軍 Division 師 Brigade 旅 Maneuver force Snesors and weapons 戰鬥部隊的感測器與武器 AMD Section 防空暨飛彈防禦組 AMD Cell 防空暨飛彈防禦小組
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圖 1 戰區防空暨飛彈防禦指揮關係

資料來源：參考 Field Manual 3-01, U.S. Army Air and Missile Defense Operations, December 2020.

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.

在近期 2022 年流沙演習和任務式指揮訓練計畫演習中，雖然將防空砲兵旅的作戰管制置於軍底下已偏離陸軍準則方向，但該作為主要是為精進演習設計，並減少陸軍防空暨飛彈防禦指揮部設立高級指揮應變組之需求，後續也衍生兩項執行障礙：其一且是最重要的是，這讓防空砲兵旅與戰區作戰脫節，切斷防空砲兵部隊在執行作戰行動時與聯合架構的鏈結；其二是讓戰鬥部隊指揮官有過多期望，認為在實際作戰行動將比聯合作戰行動擁有更大自主權。另一個問題為若無法事先預判聯合空中部隊指揮官可能無法兼具受支援的防空暨飛彈防禦指揮官的職能，從聯戰準則角度將是一個重大缺陷，這是在訓練中應避免之事。

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

為有效彌補這種落差，我們應善用支援關係，意即盟軍地面部隊指揮官可以將特定防空砲兵旅置於軍級部隊的直接支援下，同時維持其與陸軍防空暨飛彈防禦指揮部的作戰管制關係。如此一來，陸軍防空暨飛彈防禦指揮部就能統合戰區的防空暨飛彈防禦任務，並確保軍級部隊獲得所需的防空支援，以利完成所屬任務。從實務觀點而言，戰術管制與直接支援之間差異對於地面部隊的影響微乎其微，惟這對海、空作戰領域則未必成立，或許可用以解釋那些海、空軍部隊指揮官不願依賴支援關係來接收或提供相關支援。

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.

聯戰準則之存在說明聯合作戰是一個為人接受且可實踐的構想，但其功能在某些程度上與陸軍準則有所不同，陸軍準則可為精進陸軍作戰變革提供重大彈性，而聯戰準則並無此功能，因此像是陸軍的防空砲兵能力應在聯戰準則架構下，密切與聯合任務領域（如防空）做整合。聯合防空架構不能因演習設計的簡化而遭忽略，這部分需要陸軍領導幹部對區域防空計畫有全般理解，以及聯合空中部隊指揮官和聯合部隊指揮官也要對陸軍單位的權責有所理解。

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

區域防空計畫的授權討論變得至關重要，因為其中涉及防空砲兵部隊支援戰鬥部隊時的火力管制。一般而言，戰鬥部隊指揮官須向在區域接戰的短程防空部隊請求火力支援，以在協定高度下因應無人機與旋翼機威脅，同時也要在區域防空計畫內明確將接戰權授予當地指揮官，因為協定高度與授權為一體兩面，缺一不可。此外，指揮官在地面部隊的防護上，也須承擔友軍無人機在敵火環境下作業時損失的風險。由於愛國者防空飛彈部隊與運用整體防空飛彈暨防禦戰鬥指揮系統的單位有能力在協定高度以上交戰，且已與防空砲兵火力管制官和聯合火力管制架構建立完善聯繫，進而可減少防空防禦所帶來的挑戰。一般而言，現有的短程防空系統在協定高度以上的作戰能力有限，但也有例外的時候，所以也應納入在協定高度以上交戰的單位編制設計。由此可見，我們在賦予體系彈性並讓整體防空飛彈暨防禦戰鬥指揮系統作為任務式指揮的平臺，或可成為問題的解決方案。當然不管平臺能否成立，所有的授權都須在區域防空計畫中詳細律定，陸軍方面應確保在未來版本的「第 3-01 號聯戰準則：反制防空飛彈威脅」中，再次向聯合部隊傳達這些作戰需求。

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.

對於戰鬥部隊與防空砲兵部隊指揮官的另一項關鍵作戰需求為適當授權，諸如協定高度以下的接戰權，不能理所當然認為區域防空計畫往往已在戰區層級完備這種授權。防空砲兵部隊只專注於戰區級的防禦資產清單，這種方法有其優點，惟一旦變成防守軍級或師級部隊的防禦資產清單時，既有方法就會出現侷限性，這也指出區域防空計畫須明確律定盟軍地面部隊指揮官，授權讓所屬指揮幹部毋須再向上請求聯合空中部隊指揮官的同意，就得以建立自身防禦資產清單。此外，區域防空計畫也須律定支援戰鬥部隊指揮官單位的授權，或是防空砲兵指揮官直接支援單位的授權。所有的作為除了須以現有聯戰準則為依歸外，為大規模作戰行動而制定的區域防空計畫，應比當前訓練與作戰實務方面列出更多細節（在授權矩陣圖中列出詳細關係）。至少，我們在區域防空計畫、任務式指揮訓練計畫演習、流沙演習等計畫命令中應明確律定授權事項。

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.

二、支援軍級與師級的防空砲兵旅

前段所述戰區架構部分可作為任務式指揮訓練計畫演習與流沙演習的常規支援起始點。簡言之，這種架構是由防空砲兵旅直接支援軍，並受陸軍防空暨飛彈防禦指揮部的作戰管制。由於當前準則不太可能面面俱到，也無法涵蓋眾多可能出現的變數，但至少已頒布的美陸軍準則仍可作為演習設計的依據。一些戰鬥部隊指揮官或許期望對所有支援兵力行使作戰管制，這種架構在過去或當前作戰環境並非前所未見，而且該架構會持續下去是因為陸軍往往會藉由指揮關係，向諸如美國網路司令部、美國太空司令部請求作戰能力支援。所幸，美陸軍準則在支援關係上賦予受支援的指揮官充分權力，以利渠等完成所屬任務，而防空砲兵部隊亦復如此。

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.

除了指揮關係授權外，防空砲兵旅在支援軍級任務式指揮訓練計畫演習的成功關鍵，為在區域防空計畫內律定充分授權，這也是本文前述所強調重點，而充分授權模式也同樣適用於短程防空單位配屬戰鬥部隊的時候。鑒此，區域防空計畫須能解決作戰區指揮官的接戰授權問題、協定高度以下授權事項及強調適當授權。

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.

一旦建立用於演習的可行決策架構後，還需要一個可信威脅來推動指揮官的訓練目標。雖然戰鬥訓練中心的假想敵制度已存在數十年，但其威脅強度仍不足以因應陸軍當前所面對狡詰且具思考力的高端之敵；同樣道理，在防空飛彈的威脅想定亦復如此，因為新興作戰環境已提供眾多案例，說明敵人有各種能力可資用來擊敗或瓦解美陸軍部隊。就訓練目的而言，軍級與師級部隊的模擬威脅應為日益運用精準彈道飛彈、巡弋飛彈、第一至三類無人機及傳統旋翼機與定翼機之敵人，⁶而且這些威脅應適度在聯合式模擬器中進行演練，並對進訓單位進行統裁評分。2020年納卡區武裝衝突與當前烏俄戰爭的各項威脅指標更應納入模擬演練，無論單位是否有專屬的防空砲兵反制兵力，都應根據單位不同能力而設置不同的演練科目。

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 multi-domain 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.

⁶ For a detailed breakdown of the Department of Defense categories of unmanned aircraft systems, see *ibid.*, table 3-1.欲理解美國防部無人飛行系統的細部分類，參見註五文獻，表 3-1。

若不能在仿真演練下呈現缺少防空砲兵能力的問題，這將讓軍長或師長在任務式指揮訓練計畫演習時無法有效達成其訓練目的，當然我們不能寄望敵人也會存在相同問題。一個仿真威脅也有助於美陸軍在多領域作戰已成功推動的關鍵作為，諸如偽裝、指揮所分散配置及其他被動防禦措施；換言之，若只模擬一個「容易過關」的威脅，將無法磨練陸軍部隊的戰技。威脅模擬須能隨時調整難易度，才能達到訓練目的，以確保單位有效因應防空的四大威脅源（精準彈道飛彈、巡弋飛彈、第一至三類無人機、傳統旋翼機與定翼機），尤其是當這個受支援單位缺少主動防禦能力。由於具備打擊這類威脅的防空系統編制在戰區層級，軍級與師級部隊也應從事運用聯戰能力的相關訓練。

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.

防空砲兵旅與機動短程防空營重新納入任務式指揮訓練計畫演習中，可讓該兵種指揮幹部與各參謀在演習期間，有機會驗證如何運用準則解決軍事問題，從而改善準則不足之處。其中一個案例為防空任務雖然隸屬作戰職能架構，但參謀人員持續受防空砲兵兵種任務所混淆，因為其訓練主要由火力卓越中心負責，其將防空砲兵任務定位為防護作戰職能，惟若採取教條式觀點認定防空砲兵任務為特定作戰職能，將有以偏概全的問題。作戰職能為一項運用各種軍事能力來

達成任務的手段，美陸軍重視的是這些作戰職能的實用性，尤其是須理解各項軍事能力之運用，而實用性之強化可編制一個直屬師部的機動組或類似的工作組，這類單位在遂行任務式指揮訓練計畫演習時，可望從中發展出成功達成任務的新作為，這些成果再納入作戰職能的範疇。在革新過程中，我們可以檢視這個防護工作組的架構是否有助於防空任務，或是其任務範圍有過於狹隘之問題。至於參與任務式指揮訓練計畫演習的防空砲兵旅長與營長，他們在建立這種理解並確定最佳實行作法上扮演關鍵角色。

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.

軍級與師級部隊在執行任務式指揮訓練計畫演習時需要專門的教育，諸如與防空砲兵部隊協同作戰的領導幹部訓練計畫，以及在演習前舉辦各場軍事學術研討會；同樣地，旅級戰鬥隊在戰鬥訓練中心與防空砲兵部隊共同進訓時也適用這種作法。當前情況是防空砲兵上校並未讓其底下營、排發揮所長，許多現階旅長最後一次與短程防空部隊的訓練已是在他們任職尉官時。美陸軍訓練暨準則司令部也在主官職前教育課程上持續精進，尤其是著重於階段二的作戰階段，至於相關課程修訂應包含專門討論防空任務及防空砲兵部隊能力，甚至在各層級教育內容也應涵蓋指揮關係與授權事項的先期作戰討論事項。

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.

防空砲兵旅長須善用任務式指揮訓練計畫演習來訓練麾下參謀人員，以利支援戰鬥部隊指揮官的作戰需求。第 32 陸軍防空暨飛彈防禦指揮部主導的流沙演習，可提供類似在戰鬥訓練中心的進訓經驗，即訓練旅帶營執行持續性野戰作戰以支援機動作戰。由於流沙演習的複雜性與規模，致使其每兩年舉行一次，這讓陸軍部隊司令部底下的四支防空砲兵旅，各旅每兩年才能輪訓一次。防空砲兵旅除了在聯合演習計畫中獲致訓練外，也需要在駐地的訓練想定中，磨練參謀人員為指揮官提出最佳行動方案，而且任務式指揮訓練計畫的團隊應在演習中加入領導人訓練科目，大多數軍級與師級部隊也要在演習前先完成一系列指揮所演練科目。這些作為將持續成為防空砲兵旅長及其參謀人員最佳訓練的機會。就應變作戰而言，陸軍部隊司令部下轄防空砲兵旅將擔任全球兵力管理分配計畫的應變部隊，而在任務期間所執行的高強度訓練將持續由第 32 陸軍防空暨飛彈防禦指揮部監督，至於想定科目的演練也須與時俱進，才能確保各部隊全球部署整備符合作戰環境演變。

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.

三、戰鬥部隊短程防空營之整合

在美陸軍轉型旅級戰鬥隊作為主要作戰行動單位之前，師有配屬的短程防空營，營通常以直接支援角色支援特定旅，也就是營長及其參謀人員將支援師參謀部的各項作業，諸如營情報官支援師參二部分分析防空威脅、營後勤官提供師參四部關於飛彈配撥量與零組件存量、營作戰官與師參三部共同研擬作戰計畫與行動。此外，各個短程防空營將為師參三部提供一個小組，以支援作戰計畫與行動，該小組也可作為防空空域管理組的先頭部隊。如此一來，短程防空營長的責任相當於陸軍防空暨飛彈防禦指揮部指揮官之於盟軍地面部隊指揮官的責任，也就是作為戰區陸軍防空暨飛彈防禦的協調者，而且在大多數情況下，防空砲兵營長會兼任師的防空官。

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.

隨著美陸軍以機動短程防空單位重建師的短程防空能量，這些防空營會在支援師的任務式指揮訓練計畫演習與在戰鬥訓練中心進訓過程中，逐漸更新以往傳統角色。至於師的責任為要求防空砲兵部隊應重視營長與校級軍官的培育，因為這些人都缺少師結構在轉型前的實務經驗。誠如普魯士軍官斯圖本男爵的建議，美國陸軍應審慎挑選士官，同樣道理，機動短程防空營長的挑選與培育，也是不可低估的重要工作。⁷培訓計畫好處在於獲挑選的指揮幹部，可在任務式

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, <https://www.loc.gov/item/05030726/>.

指揮訓練計畫演習與在戰鬥訓練中心進訓中擔任觀察員，其中許多課程也同樣適用在防空空域管理組身上，並也可整合至主官職前訓練課程。

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 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.

另一個人才管理挑戰為籌獲「觀察管制暨訓練員」(以下簡稱 OC/T)，防空砲兵兵種一直以來都認為須挑選優秀軍官和士官，以負責任務式指揮訓練計畫和戰鬥訓練中心的相關事務。鑒於未來幾年該兵種人員需求的增長，以及在填補其他關鍵需求人員的同時，還要建立具旅長資格的聯戰軍官候選幹部；由此可見，補實 OC/T 職缺將充滿挑戰性，尤其是校級與資深士官的缺額。在軍官人力方面，可能需要從廣泛補實任務需求轉變為優先填補最關鍵需求；在士官人力方面，OC/T 職缺填補須在教練士官和招募士官之間取得平衡。鑒於自 2003 年以來防空砲兵准尉的職缺與角色重要性逐漸增長，該兵種也應探討這些人如何在任務式指揮訓練計畫演習與戰鬥訓練中心發揮功能。

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.

與前文所述在任務式指揮訓練計畫演習的威脅呈現一樣，戰鬥訓練中心的仿真訓練也需要呈現可信與致命的威脅。面對威脅的進步與擴散，我們須建構一個靈活應變模式，才能讓戰鬥訓練中心及時修正威脅呈現的作法。由於駐地訓練可能會受到當地空域限制與複製威脅能力之影響，防空砲兵部隊接受首批防空假想敵的訓練應該會是在戰鬥訓練中心。為彌補這種訓練落差，防空砲兵部隊在戰鬥訓練中心進訓或海外部署之前，設置一支運用第 1、2 類無人機的防空假想敵，也可達到關鍵的訓練效果，這種防空能力不僅有利於配署機動短程防空部隊的基地，甚至是改良式編裝的基地也同樣受益。

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.

機動短程防空部隊的火力管制與接戰授權引起廣泛爭議，原因出於這種兵力支援架構的設計，其中一個極端例子是接戰授權由各防空砲兵組下達，另一個極端例子則是所有火力都由防空砲兵火力管制官管制。誠如國家首都區防禦的

情形，當地條件與風險接受度會催生高管制的防空方案；⁸此外，考量在通信中斷環境運作的預期需求，以及為提高存活率而降低我方電子信跡，較理想可行的方案為分散式火力管制，而這種方案也呼應前文所述，陸軍須適切律定區域防空計畫內的各授權事項，至於在支援戰區防空部隊上，美陸軍部隊指揮部扮演關鍵角色，近期案例為在反小型無人機接戰授權上取得成功，這個事實也說明應專注於師的防空空域管理與聯合空地整合中心的訓練。火力管制與接戰授權也須考量由防空砲兵單位以外部隊來部署反無人機能力，無論是由誰擔任操作者，防空砲兵兵種可能仍將是反無人機能力訓練與認證的主導者。

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.

整體防空飛彈暨防禦戰鬥指揮系統的靈活本質，來自於具備多個感測器與受動器，這讓未來配備該系統單位有額外的戰術行動方案選項。經試驗證實整體防空飛彈暨防禦戰鬥指揮系統可以整合聯合感測器；如此一來，運用該系統的機動短程防空營將連接系統本身的火力管制網絡節點與愛國者發射器，並接收如 F-35 戰機的聯合感測器軌跡，進而防禦師的各項資產。鑒此，整體防空飛彈暨防禦戰鬥指揮的靈活性，同樣需要一個靈活火力管制模式，才能最大化武器系統效能，而後續的聯合試驗在發展這套模式時至關重要。

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

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. 國家首都區防禦由地面防空單位負責始於 2001 年高貴之鷹行動(美加在 911 事件的國土安全行動)，接戰目標授權集中在單一指揮中心，其受到須保護民航的嚴格交戰規則限制。

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.

機動短程防空單位部署至師將耗費多年時間，於此過渡期間，軍、師及機動旅旅長將持續依賴防空空域管理組，對照防空砲兵軍官與准尉現有編現比，這個組目前在陸軍部隊司令部內仍處於缺員狀態。此外，機動短程防空營的增加將進一步擴大防空空域管理組人力需求的難度，因為各新式機動短程防空營的防空砲兵上尉數量相當於 $4/3$ 個師編制的防空空域管理組防空砲兵上尉數量，而准尉數量相當於整個師除了一個職缺以外的所有職缺。隨著師與旅逐漸依賴其防空空域管理組將單位空中圖像整合至聯合空中圖像，以及新興反無人機能力，將浮現這類人才管理挑戰，誠如戰鬥部隊指揮官在堅定決心行動與烏俄戰爭的支援行動經驗所示。⁹為弭平這種落差問題，第 108 防空砲兵旅已協同第 18 空降軍啟動一個防空空域管理組監控計畫，以利協助戰鬥部隊指揮官因應新興的作戰環境。根據受支援軍級與師級部隊的成功經驗與正向回饋，第 32 陸軍防空暨飛彈防禦指揮部將在來年讓該計畫擴大施行於陸軍部隊司令部下轄單位。防空空域管理組也能以觀察員或客座「觀察控制員/教練」身分，廣泛參與任務式指揮訓練計畫演習和流沙演習，從中獲益。

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.

⁹ Comment extrapolated from multiple after action reviews and assistance visit trip reports for Operation Inherent Resolve and Ukraine support missions. 該論述歸結自各行動後檢討，以及堅定決心行動與烏俄戰爭支援任務的援助訪問報告。

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

大規模作戰行動中防空砲兵部隊的訓練與裝備

一、訓練與任務要項清單

為因應未來大規模作戰行動，全般檢視防空砲兵部隊訓練為先決條件，該兵種當前挑戰為在修正訓練模式的同時，如何保留過去數十年維持最佳戰備狀態的作法。此外，兵種也應確定配備整體防空飛彈暨防禦戰鬥指揮部隊的訓練方向，因為該系統可提供單位在戰術運用的高度靈活性。由於整體防空飛彈暨防禦戰鬥指揮系統的全面部署將耗費十年時間，防空砲兵兵種應預先規劃未來融合這種能力時所需訓練方式。

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). 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).

美陸軍準則說明在訓練時使用任務要項清單之重要性，因為可以讓指揮官理解一些任務的風險，若這種指揮官式的任務要項清單能轉變為陸軍部教令式

的任務要項清單，或許可以達成單位之間標準化，進而了解特定單位訓練可達到何種預期效果。不過，對防空砲兵部隊而言，任務要項清單的兩項標準化內容存在明確性不足問題，例如在防空砲兵營（配備愛國者飛彈）任務要項清單（僅列兩項，其中一項涵蓋部署活動）中，除了無法看出營長有承受特定任務的風險能力外，內容描述主要是作戰支援任務，而且單位在執行各要項清單前都須達到「戰術級」（以下簡稱 T）訓練認證；反觀步兵營（配備整體防空飛彈暨防禦戰鬥指揮系統）任務要項清單則有六項清單（參見圖 2）。防空砲兵營(配備愛國者飛彈)任務要項清單項次一為「負責防空暨飛彈防禦作戰」，底下又分成六個子要項，其中兩項為副營長職責，其中一項可認定為旅長或陸軍防空暨飛彈防禦指揮部職責。子要項四內容已涵蓋大部分愛國者營職責，惟其問題在於並未涉及訓練策略，表述模糊也容易引起指揮官之間不同見解（參見圖 3）。

Infantry Battalion METL (IBCT)	ADA Battalion METL (Patriot)
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	1. Conduct Air and Missile Defense Operations 2. Conduct Expeditionary Deployment Operations at BN level

Figure 2. Infantry Battalion and Patriot Battalion METL Comparison

Source: HQDA METLs, Army Training Network.

步兵營任務要項清單(步兵旅級戰鬥隊)	防空砲兵營任務要項清單(愛國者部隊)
1. 執行區域防禦 2. 移動與敵接觸 3. 進行攻擊 4. 從事空中突擊 5. 負責區域安全 6. 負責營級遠征部署作戰	1. 負責防空暨飛彈防禦作戰 2. 負責營級遠征部署作戰

圖 2 步兵營與愛國者營任務要項清單之比較

資料來源：參考 HQDA METLs, Army Training Network.

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 3. Comparison of Core ADA METL Tasks at Echelon

Source: Figure adapted by author from Training and Evaluation Outlines on the Central Army Registry

防空飛彈作戰任務執行摘要

陸軍防空暨飛彈防禦指揮部(Task 44-EAC-8040)

1. 負責防空暨飛彈防禦戰區級規劃
2. 指揮官依令擔任地區防空副指揮官
3. 執行防空暨飛彈防禦作戰
4. 提供戰區防空暨飛彈防禦協調組與聯絡官，並配屬至各聯合作戰區所屬單位
5. 防護聯合作戰區內各項系統與兵力
6. 調整防空覆蓋範圍

旅(Task 44-BDE-8040)

1. 防空規劃
2. 防空協調
3. 統整防空武器裝備，以滿足區域防空計畫所需
4. 調整防空覆蓋範圍

營(愛國者)(Task 44-BN-8040)

1. 副營長帶領參謀制定防空計畫
2. 與聯合暨所屬防空火力單位共同協調空域管制活動
3. 對受支援資產提供早期預警
4. 運用建制武器系統提供防空暨飛彈防禦能力，以防護設施、機動裝備及防護部隊避免受敵監視、空中攻擊及/或彈道飛彈威脅。
5. 防護作戰電子相關系統與兵力
6. 副營長協調營各項後勤支援作為

圖 3 各級防空砲兵部隊任務要項清單核心任務之比較

資料來源：參考 Training and Evaluation Outlines on the Central Army Registry，經作者彙整製表。

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 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 multi-domain 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.

當前任務要項清單存在明確性不足問題，理論上，運用聯合兵種訓練戰略應可協助指揮官建立可行的訓練計畫，這種方法能讓防空砲兵部隊在建立戰備能力時聚焦於火炮射擊、特定任務的高峰期訓練項目或任務預演。部隊在訓練時應運用任務要項清單，藉由這種方法的愛國者營可達到 T1 訓練水平，根據近期

2022 年流沙演習的經驗顯示，不管是聯合兵種訓練戰略表或是射擊表，都並未將要支援戰鬥部隊的各項任務做整合，這意味著愛國者營就算達到 T1 訓練水平，也不代表其整體訓練足以支援大規模作戰行動。這種落差為防空砲兵指揮官的一項挑戰，因為他們在試著準確調整戰備來支援戰鬥部隊指揮官的同時，還須理解自身能量可以支援到何種作戰類型。在多領域作戰中的防空砲兵作為相當複雜，不可能以單一任務要項清單一言以蔽之，防空砲兵兵種須理解定點防禦與戰鬥部隊防禦之間存在差異。至於防空砲兵部隊定點防禦的戰備評估，為驗證砲組在作戰區能否提供持久戰備能力，但若遇到砲兵部隊為支援戰鬥部隊指揮官而從事短期停留的陣地轉移時，則定點防禦的戰備評估就不太適用。誠如步兵營任務要項清單有多種不同任務列表，防空砲兵部隊任務要項清單也應有所區別，才能讓所屬指揮官理解風險並面對未來任務，舉例而言，要讓準備部署至美國中央司令部責任區支援戰鬥部隊的防空砲兵部隊具備一定風險承受力，就必須在整備部署階段完成廣泛的任務演練。本文提議的砲兵營任務要項清單（如圖 4）為針對原本缺陷做改良，以解決砲兵部隊在支援戰鬥部隊時無足夠參考依據，並讓砲兵指揮官得以制定關於訓練計畫的風險決策表。

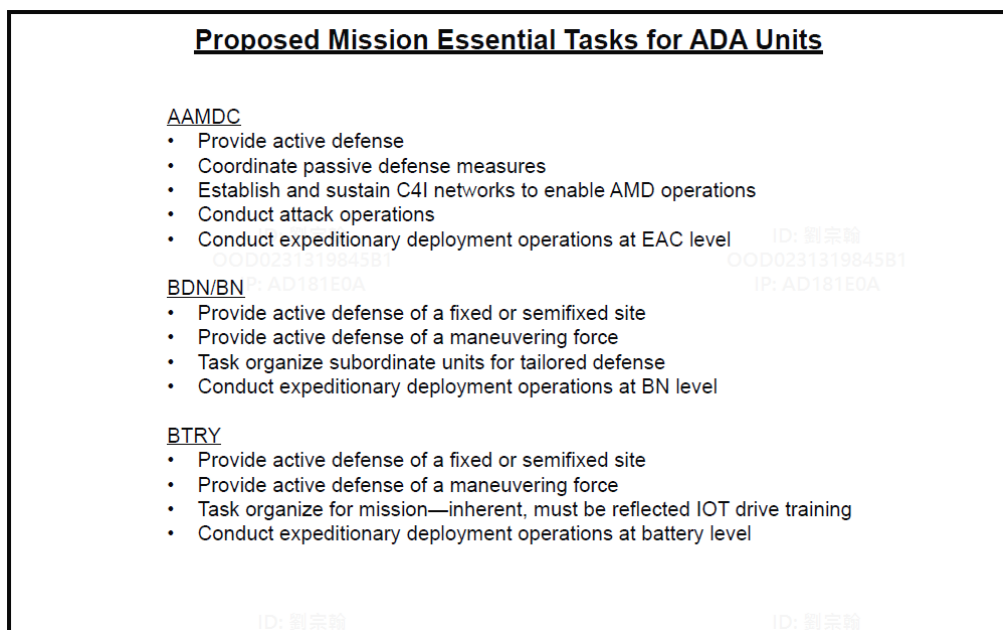


Figure 4. Proposed ADA METLs to Support LSCO

Source: by author

本文建議的防空砲兵任務要項清單

陸軍防空暨飛彈防禦指揮部

- 提供主動防禦
- 協調被動防禦措施
- 建立並維持指、管、通、資、情網絡，以支援防空暨飛彈防禦作戰
- 執行攻擊作戰行動
- 負責軍以上層級遠征部署作戰

營

- 提供固定或半固定陣地主動防禦
- 提供戰鬥部隊主動防禦
- 依防禦任務屬性編隊
- 負責營級遠征部署作戰

連

- 提供固定或半固定陣地主動防禦
- 提供戰鬥部隊主動防禦
- 任務編隊應進行初期作戰測試，才能策進訓練
- 負責連級遠征部署作戰

圖 4 本文建議在大規模作戰行動下的防空砲兵任務要項清單

資料來源：由作者彙整製圖

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 turn 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 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.

為因應大規模聯合作戰行動之需求，建構一支整體防空飛彈暨防禦戰鬥指揮系統部隊，將需要不同訓練方法。由於負責特定任務的特遣單位本身就具備靈活性，標準化火力單位將不再是一個必然選擇，甚至是非理想選項；再者，單位狀態報告應用以準確傳達訓練與戰備水準，而這些水準又受到任務要項清單的各種評估所影響。若美陸軍選擇建構各種不同能力的整體防空飛彈暨防禦戰鬥指揮連，諸如感測器連、受動器連和指管連，而不是建構標準火力建制單位，我們就須專精於建構不同任務的特遣任務連隊。如此一來，這個劃時代意義為首次依單位狀態報告來衡量營級戰備水準，營長也能根據不同任務性質編組相關作戰能力的連隊，但這並非意味著單位狀態報告的改變，其作用仍是向陸軍、聯合參謀和作戰指揮官通報如旅部、營或終端高空區域防禦連等戰備狀態（依各「防空」部隊識別代號）；惟真正改變為營長評估所屬單位戰備狀態方式。營不僅須依各部隊識別代號所產出的單位狀態報告來評估連隊戰備水準，還須評估負責特定任務的特遣連隊的戰備，以利說明有意義的作戰能力。這可能會影響聯合部隊指揮官所提的作戰需求，意即不再提出特定的防空火力單位支援，而是持續向營提出需求，因為營主導任務所需的各種特定能力編組。在美陸軍從愛國者轉型為整體防空飛彈暨防禦戰鬥指揮系統部隊的十年間，聯合部隊將持續面臨挑戰，防空砲兵部隊在整體防空飛彈暨防禦戰鬥指揮系統單位架構下，雖然有機會使用較小單位解決戰術問題，但在請求防空砲兵支援時，營才是那個委以重任者。

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.

關於如何訓練愛國者與整體防空飛彈暨防禦戰鬥指揮系統部隊來支援大規模作戰行動，我們可以從檢視當前愛國者營射擊架構表著手，只要稍做內容修正，就能符合完成所屬任務所需的戰備基礎，調整後將更明確著重於個人、砲組及團體任務。根據筆者曾任營、旅長的觀察經驗，幾乎所有砲兵領導幹部與大部分校級軍官的訓練思維都不是以個人與團體任務為重點，反而幾乎都只專注於射擊表的防空砲兵訓練。個人訓練通常與防空砲兵訓練分開，涉及一般士兵任務或強制性訓練事項，由於圖 5 的表八射擊認證為首個戰備評定目標，促使砲兵連形成集中訓練現象，在這種心態下，無論陸軍決定怎麼打造這些營，都無法提供整體防空飛彈暨防禦戰鬥指揮系統部隊所需的靈活性。因此，射擊表從個別任務重新修訂為團體任務的方法，將有所助益，也就是著重於組員在終端重大事項的認證，有別於以往集體連隊事項的認證。整體防空飛彈暨防禦戰鬥指揮系統營下轄連隊（依裝備類別區分）必然需要這種方法，因為在聯合部隊戰力運用觀點下，集體連隊訓練事項並無法彰顯獨立可靠的戰力。若陸軍保留火力單位模式，本文所建議方法將能實現整體防空飛彈暨防禦戰鬥指揮系統部隊的靈活性，並讓所有經認證的裝備(如發射器或雷達)順利配屬至特遣編隊。經改良的射擊表首先解決個人任務，接著解決組員與團體任務，最後達到解決集體任務（參見圖 5）。此外，營還需要驗證特遣連隊是否完成任務前整備，這將推動由營主導的集體訓練事項。

<u>Current Patriot Battery Gunnery Tables</u>	<u>Proposed Gunnery Table Progression</u>
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

Figure 5. Gunnery Table Progression

Source: 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.

<u>當前愛國者射擊表</u>	<u>本文建議的改良式射擊表</u>
表一（基本系統技巧）	• 個人任務
表二（行動整備演練）	• 所有人的共同個人任務
表三（基本空戰管理/飛彈再裝填）	• 特定個人的系統任務（如發射器或雷達）
表四（基本射擊認證）	• 組員與團體任務
表五（空戰管理/飛彈再裝填）	• 組員的終端重大事項演練
表六（陣地轉移與掩體進出）	• 空戰管理
表七 指揮官評估（表八的先期認證）	• 再裝填
表八（中級射擊認證）	• 進行裝備偽裝
表九（預警狀態假定／行動整備演練）	• 集體任務（連）
表十一 指揮官評估（表十二的先期認證）	• 連編隊陣地轉移與掩體進出之整備
表十二（前進級別的射擊認證）	• 執行空戰
	• 進行信號／信跡偽裝

圖 5 改良式射擊表

資料來源：左表參考 Training Circular 3-01.86, Patriot Gunnery Program，右表為本文建議的改良式射擊表。

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.

這也引起對當前進階射擊表的深入分析，其理論上應為指揮官提供所屬任務要項清單的戰術評估水準，惟當前狀況是該表完全背離在單位狀態報告中說明戰備水準。許多領導幹部認為做到表十二有其價值，但這並無法說明當缺少熟手組員時的戰備水準，換言之，我們認為應該按表執行，但我們無法量化其中的戰備水準。此外，我們也缺少一個專門表格供在自主作戰模式下的單位使用。鑒於美軍最具挑戰的戰略競爭對手所擁有的電磁頻譜能力，我們的想定也應包含防空砲兵部隊會在通信阻斷環境下作戰，無法與防空砲兵火力管制官傳遞訊息。最後，前進射擊表應在任務要項清單中更明確說明如何達到「戰術」水準，該評估在實務上應更為量化，由於近期所採用「客觀戰術」評估出現問題，一個量化的訓練評估方式將更有助於指揮官評估戰備狀態。

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. 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.

鑒於未來可預期的電磁頻譜敵情環境，防空砲兵單位訓練科目須包含遭電子攻擊時的作戰演練，還應建立靈活編組能力，以利支援整體防空飛彈暨防禦戰鬥指揮系統部隊所負責的特遣任務。防空砲兵單位除了空戰訓練外也要持續精進，以利支援戰鬥部隊的攻防作為。此外，還有一個重要工作為強化保修訓練，以符合整體防空飛彈暨防禦戰鬥指揮系統部隊本身的靈活性，「修護或作戰」的準據或許應調整改變，因為在大規模作戰行動中，營級保修人員未來將在分散的地理區作業。防空砲兵指揮官將在執行上述所有要求的同時，與麾下組員建立密切指揮關係。鑒於當前表十二仍有大幅調整空間，防空砲兵兵種應審慎修訂成合

適的射擊架構，確保不會影響作戰環境中基本要求的熟練度。

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).

二、大規模作戰行動的防空砲兵裝備整備

美陸軍領導高層的未來戰場想定，將推動一些既有在發展、測試及最終部署核心作戰裝備以外的其他武器部署思維。敵藉由信號情報、地理情報、測量、信跡情報及圖像情報等偵測美軍一舉一動，已促使陸軍領導高層重新思考指揮所、網路及偽裝等作為，以下將簡短討論主要終端武器系統，如整體防空飛彈暨防禦戰鬥指揮系統、機動短程防空系統，以及間接火力防護能力等以外的武器部署思維。

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.

帳篷式指揮所並不適用於大規模作戰行動幾乎是無爭議的觀點，因為在2022年時陸軍部隊司令部召開一個指揮所峰會，軍、師及直屬單位主官等與會者一致共識認為，指揮所須具備機動、偽裝、分散部署等特性。一般在論及指揮

所現代化議題時，往往著重於硬體設施，但關於指揮所電子通信設施在轉移前後的撤收與架設也至關重要；換言之，單位須具備快速撤收與架設的通信網能力，不能再用以往繁複的通信網架構。當面臨敵情嚴峻的通信環境時，一旦無法維持可靠通信時，指揮所組成的分散部署將成為權宜之計，例如現行整體防空飛彈暨防禦戰鬥指揮系統的火力管制指揮所持續不斷發展，防空砲兵兵種必須針對上述情況預做準備，這個方案應全般檢視各個參謀並確保每個人處於戰場最佳位置。由於分散式指揮所結構須具備可持續性，全面性組織評估不可或缺，例如 2022 年流沙演習就顯示防空砲兵旅部在執行戰術指揮所演練時面臨眾多挑戰。

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.

防空砲兵單位也必須使用與機動單位相同的任務式指揮系統，在 2022 年流沙演習期間，第 11 防空砲兵旅配備指揮所運算環境系統，用來與第 1 裝甲師（以該師充當第 3 裝甲軍角色）做整合。指揮所運算環境系統的問題在於，其不僅與傳統指揮所未來系統（包含建制任務式指揮系統集）的相容性有限，而且也是單位唯一可與受支援機動單位共享任務式指揮資料的方法。基層的防空砲兵營並未配備指揮所運算環境系統，這限制其與防空砲兵旅部的溝通能力。美陸軍部隊司令部主張加速為第 32 陸軍防空暨飛彈防禦指揮部所屬單位配備指揮所運算環境系統，可以想見，當這些單位進行部署以支援歐洲司令部與印太司令部所屬防空砲兵旅部時，將需要一個健全的行動方案。

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.

在未來預期的作戰環境中也要重新評估偽裝品項，因為在過去二十年間不知何故各種偽裝品項並未被納入經改良的編裝表（規定單位人裝編制數的文件）中，雖然只要偽裝品項仍列在通用裝備表（並未列入改良式編裝表），就可經由採購程序獲得，但這種方式並不利於陸軍評估補給戰備水準。此外，偽裝品項未列在經改良的編裝表中，將削弱單位的建制運輸能量，也會導致戰術車輛的減少，值得後續注意的是，愛國者營是否有能力在運載所有偽裝品項(假設已獲得相關品項)的同時，又能適切支援戰鬥部隊。偽裝品項若能列入改良式編裝表，指揮部將能評估補給戰備水準並重新評估運載量需求。

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 divestiture 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.

結論

過去幾年來，誠如許多資深防空砲兵幹部的觀察，當前可能是成為一位防空官兵的最佳時刻，因為他們能目睹師短程防空系統的轉型，無疑是個寶貴經驗。美陸軍理解在新興作戰環境中各項能力之重要性，不斷演進的反無人機作戰已引起戰鬥部隊指揮官的重視，那些近期歷經伊拉克與歐洲作戰經驗的人，已成為

全面應對這些挑戰的積極支持者。任務式指揮訓練計畫演習和其他訓練也將隨著這個趨勢不斷演進，以確保陸軍部隊能迎接當前的各種挑戰。

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 multi-domain 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.

機動短程防空系統營之部署與整合為不可或缺之一步，但並無法保證戰鬥部隊就能在多領域戰場上克敵制勝，誠如防空砲兵兵種過往在伊拉克自由作戰中的表現，幾乎所有防空砲兵能力在支援大規模作戰行動時都發揮重要作用，所以防空砲兵兵種應持續通盤檢視未來支援這類戰事的方式。由於美陸軍與聯合部隊自 2003 年以來已發生重大變化，支援早期舊陸軍作戰構想的防空構想，必然要調整以因應新的挑戰，這些重大工作包含打造務實的聯戰準則，以確保防空砲兵部隊達成所望作戰效果；全面檢視演訓，以重新引進整體防空砲兵組成戰力，進而支援戰鬥部隊；扎實部隊行動設計，以確保未來戰力可發揮最大作戰效能。

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 (ReARMM) 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.

防空砲兵部隊在執行這些重大工作的同時，也要維持全球作戰能量並完成部隊整備，以隨時投入部署。此外，一旦整體防空飛彈暨防禦戰鬥指揮系統完成測試並達到初始作戰能力後，防空砲兵部隊應著手打造現代化的愛國者部隊，例如區域結盟戰備暨現代化模式計畫，將讓陸軍部隊司令部下轄防空砲兵單位在八個月期間轉型為現代化部隊，後續階段還有集體訓練及任務行動，至於單位要做的工作為迅速讓各項軍品現代化，另在組織培訓方面，盡可能運用現有知識並做出所需變更，以利配備整體防空飛彈暨防禦戰鬥指揮系統單位發揮最大化作戰效能。簡言之，防空砲兵部隊須迅速重新打造這些單位，以利隨時投入作戰部署。

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

本文所提關於支援戰鬥部隊的各項防空問題解決方案，或許有經驗領導幹部並不一定認同，雖然這些不同見解並不像作戰整備意見分歧那樣激烈，但這個解決方案必然會遭受強烈反對意見與辯論之挑戰，這個過程有助於砲兵兵種的作戰學習，因為在確定最佳方案後，陸軍一定會反覆驗證其可行性。誠如莎士比亞《亨利五世》劇本中，主角國王激勵部隊的話，「屏住呼吸，像弓弦一樣繃緊每個神經」，我們要充滿活力參與這場辯論，每位防空官兵都應為這個努力做出貢獻。¹⁰

譯後語

美國國防戰略定調未來美軍將面臨大規模作戰行動，陸軍的因應之道為多領域作戰構想，至於防空砲兵部隊也應與時俱進，才能在未來大規模作戰行動中

¹⁰ Shakespeare, Henry V, 147.

有效支援戰鬥部隊之作戰。本文以此為發想，提出防空砲兵部隊在組織、接戰授權、裝備系統、任務要項清單、射擊要項表等各方面之建議。其中，防空砲兵部隊未來的利器為整體防空暨飛彈防禦戰鬥指揮系統，因為過往的防空系統並未考量到整合問題，導致不同系統無法共通，甚至同款武器的不同發展型號都不易互通，該系統可望整合現有防空系統，打造多層次攔截網，以對抗彈道飛彈、巡弋飛彈、火箭、火砲、迫砲，以及無人機等威脅，朝聯合全領域指管方向前進。

觀諸俄烏戰爭經驗，防空為確保國家安全的重要環節，尤其我國面臨中共彈道飛彈、巡弋飛彈及無人機等威脅，唯有建構重層攔截火網，形成高、中、低防護火網，才能防護部隊戰力，有效保衛政軍中樞及重要基礎建設。陸軍砲兵部隊職責為低空防護，除了在各演訓中持續強化「射指、測量、觀測、通信、砲操」五大專業領域外，也應借鑒美軍防空系統發展整合問題，意即陸軍防空砲兵部隊如何與中高空防空部隊進行順暢整合，打造一個完善的作戰管理及情資交換網，將是防空砲兵戰力發揮的關鍵。此外，防空砲兵部隊也應定期辦理戰術戰法研討會，在各方觀點下激盪出最適合的防空戰術，以發揮聯合防空防護效能。

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