多領域作戰：21世紀兵種協同

Multi-Domain Battle : Combined Arms for the 21st Century

譯者簡介

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Purpose and Scope

This Multi-Domain Battle: Combined Arms for the 21st Century white paper describes a coordinated Army and Marine Corps approach for ground combat operations against a sophisticated peer enemy threat in the 2015-2040 timeframe. It is intended to promote thought and discussion concerning the methods and capabilities required to confront sophisticated threats. It offers specific hypotheses to inform further concept develop, wargaming, experimentation, and capability development. This paper encompasses the views of the U.S. Army and U.S. Marine Corps regarding an endeavor that involves the entire joint team. It is therefore published with the expectation that the ideas herein will, in concert with the other Services, be refined and expanded into appropriate joint concepts.[1]

目的暨範圍

《多領域作戰：21世紀兵種協同》白皮書係說明美國陸軍與海軍陸戰隊針對

2015～2040年期間，針對具精密戰力勢均力敵之威脅所提出之地面戰鬥。目的在於推動有關因應複雜威脅所需方法及戰力的相關思考與探討。提出多項針對性假定事項，以進行更深入概念策擬、兵棋推演、部隊驗證與戰力發展。本報告內容所涵蓋之美國陸軍與海軍陸戰隊觀點，將攸關整個三軍聯合作戰團隊之未來共同作為。因此，藉此一刊出，能使此中各類觀點引起其他軍種共鳴，據以精進並擴大為適用之聯合作戰概念。[1]

Background

To address challenges of dfeating a numerically superior adversary, the U.S. Army and U.S. Air Force began development of the AirLand Battle concept in the late 1970s. Approved as doctrine in 1982, AirLand Battle defined the manner in which large-scale ground combat operations would be conducted against a peer adversary. Among its key characteristics were the notions of integrated battel and the extended battlefield. Integrated battle necessitated that every asset at a commander's disposal be employed to achieve defeat of the enemy hwile the extended battlefield embraced the concept of the 'deep battle.'[2] The concept propelled military advances through the end of the Cold War.

背景

美國陸軍與空軍針對戰勝數量優勢之敵人所面臨之種種挑戰，於1970年代末期開始發展「空地作戰」(AirLand Battle)概念。在1982年正式成為準則後，空地整體作戰成為於大型地面作戰用來對付實力相當敵人之要則。其要點包含戰鬥整合和延伸戰場等兩大概念。戰鬥整合要求指揮官掌握的所有資產均須用於發揮剋敵制勝的效果，而延伸戰場則是以「深遠作戰」概念為基礎。[2]此一概念促成了冷戰結束前的諸多軍事領域進

1 聯合作戰管道構想(Joint Operational Access Concept, JOAC)確認在面對日益強大敵人與對抗領域內武裝時，欲於某一作戰區域投射軍事力量與維持其作戰的問題。該構想文件建議運用跨領域協同戰力－以相輔相成而非各自為用，彼此長短互補－藉此同時在多個領域創造優勢，以提供任務所需之主動。

2 John Romjue，《從主動防禦至空地作戰：陸軍準則之發展1973-1982》，頁23～44；Douglas Skinner，《空地作戰準則》專業文書463，1988年9月，海軍研析中心出版，頁17～20。

展。

When the Cold War ended, U.S. defense policy postulated that a new era had dawned in which conflict against a peer adversary was unlikely. This hypothesis was supported by operations throughout the 1990s in which the U.S. military applied the relative conventional superiority it developed in competition with the Warsaw pact to dominate a larger conventionally armed opponent and subsequently conducted a number of low-intensity or limited-commitment conflicts. The loss of a clear strategic peer adversary, combined with the resultant shift in operational commitments and budgetary considerations, triggered a reduction in military capacity that was, at the time, justified by the nature of ongoing operations.

在冷戰結束後，美國在國防政策方面推論，未來在新時代的衝突中要遭遇勢均力敵的敵人可能性甚低。此項假定於其後更獲得1990年代所有軍事行動的支持，美軍在此一期間所運用之相對傳統武力優勢，原本係與華沙公約集團角力時，為擊敗更大規模傳統武裝對手而建立，但之後卻只用於執行一連串低強度或有限投入兵力的衝突。勢均力敵戰略層級對手確實消失，加上後續作戰層次的運用規模與預算考量因素，造成今日軍事能量不斷萎縮，其原因正是由於當前軍事行動的本質。

The limited operations of the 1990s realized an expansion in the reliance on systems that enabled precision standoff strike capability, while the capacity and capabilities required for the close fight, such as maneuver forces and counter-imporvised explosive device (IED), atrophied. Technologically advanced deep-strike systems underpinning the standoff approach were seen as cheaper alternatives to even more expensive personnel and organizations, so capacity in ground combat organizations was reduced. Although assets for the close fight were updated periodically to extend service life, there was little innovation in close fight capabilities during this period. Entering a new century, defense planners envisioned future conflict in which the ground combat forces played a reduced role in destroying enemy combat forces.

1990年代的有限軍事行動導致美軍日益依賴各種可發揮精準遠距打擊戰力的系統，同時近接戰鬥所需之能量與戰力，諸如機動部隊與反制急造爆炸裝置，卻萎縮了。遂行遠距作戰所必須的先進科技深遠打擊系統，被視為較昂貴人力與組織的廉價替代方案，

因此地面戰鬥編組的能量降低。儘管近接戰鬥所需之資產仍定期進行性能提升，以延長其使用壽命，但在此一期間卻幾無任何創新作為。在進入新世紀之後，軍事計畫人員推估，未來戰爭在殲滅敵軍戰力方面，地面戰鬥部隊的角色僅能扮演配角。

However, soon after the 21st Century began, the U.S. conducted two decisive, offensive joint campaigns, extending into unanticipated counterinsurgency campaigns. These campaigns did not necessitate the procurement of advanced ground combat platforms because the adversary employed capabilities that placed a premium on U.S. protective adaptation. The focus of training and equipping the force shifted from defeating a peer adversary to defeating an asymmetrical and terrorist threat. A decade and a half of counterinsurgency campaigns, coupled with the drawdown and repositioning of forward deployed forces to the continental U.S., and the continued stagnation of close fight capabilities further eroded the ability of the U.S. military to confront a peer adversary.

然而，就在21世紀開始後不久，美國實施了兩場決定性攻勢聯合戰役，卻曠日持久變成難以逆料的反叛亂戰役。這兩場戰役並不需要採購先進地面戰鬥載臺，因為敵人所運用的各種戰力，讓美軍的部隊防護考量成為當務之急。部隊訓練與裝備重點從原本的如何擊敗實力相當之對手，變成如何擊敗不對稱及恐怖主義威脅。連續15年的反叛亂戰役，加上前進部署兵力的縮減與重新調整部署回到美國本土，加上近接戰鬥能力持續停滯不前，進一步侵蝕了美軍對抗勢均力敵對手的能力。

Concurrent with the decline of U.S. conventional capabilities for the close fight, potential adversaries were analyzing the manner in which U.S. armed forces deployed combat power and executed operations to develop methods for countering American advantages in all domains. Adversary developments, as will be discussed, challenge U.S. abilities to conduct decisive operations and necessitate a reexamination of the method for executing operations against a peer adversary.

當美軍在近接戰鬥的傳統戰力不斷下降的同時，潛在敵人卻開始分析美軍部署戰力及執行作戰的方式，以發展反制美國在所有領域優勢的方法。如後文所將探討者，敵人的發展已對美國遂行決定性作戰的能力構成挑戰，因此實有必要重新檢視對付實力相當對手的作戰方法。

Whereas AirLand Battle focused primarily on two domains, the modern operating environment calls for new concepts to counter adversary adaptations by fighting in a coherent manner across five domains. Today and into the future, the U.S. will have to confront adversaries contesting the physical domains of air, land, sea, and space, the 'abstract' domain of cyberspace, as well as the electromagnetic spectrum, EMS), the information environment, and the cognitive dimension of warfare.[3] As a result, U.S. forces must evolve the way they are organized, trained, equipped, and postured in order to deter and, if necessary, defeat potential adversaries.

相較於僅以兩大領域為重點的空地作戰，現代作戰環境需要之新概念，以反制敵人在五大領域以嚴謹方式遂行作戰的各項調適。從今日到未來，美國必然會面對敵人對空中、地面、海上和太空等實體領域的競爭，以及網路空間「抽象」領域的抗衡，再加上電磁頻譜、資訊環境和戰爭認知面向等方面的交鋒。[3]因此，美軍部隊必須在組織、訓練、裝備和部署方面不斷精進，才能嚇阻敵人，並在必要時，擊敗各種潛在敵人。

The emerging operational environment

Studies of the emerging operational environment describe a future of contested norms and persistent disorder.[4] Revisionist states, operating under the threshold that would trigger decisive U.S. response, seek to alter the post-Cold War security order by coercing neutrals, U.S. partners, and allies through economic pressure, disinformation, and the threat of military force. Potential enemies will use deception, surprise, speed, and all elements of national power to exploit seams within established U.S. operating methods. Moreover, these adversaries may manipulate the risks of escalation by threatening use of weapons of mass destruction or disruption.[5] These actions exploit perceived U.S. weaknesses such as time and distance for force deployment, sustainment, and vulnerable bases, ports, and command and control networks. By operating in this manner, adversaries achieve their objectives by creating a fait

3 聯合軍種確認五大領域－包含空中、地面、海上、太空和網路空間。本文特別強調電磁頻譜、資訊環境和戰爭認知面向是美軍未來必須解決的新增對抗性領域。

accompli before U.S. forces can adequately respond.[6]

成形中之作戰環境

針對成形中作戰環境的各種研究，都認為未來的世界將充滿相互對立的行為規範和持久性失序。[4]修正主義國家透過在美國不至於進行決定性反制的門檻下運作，希望能藉經濟施壓、扭曲性資訊以及威脅動武等手段，達到裹脅中立國、美國夥伴與盟邦的效果，以改變後冷戰的安全秩序。未來各種潛在敵人會使用欺誘、奇襲、速決及舉全國之力，尋找利用美國既有作戰方法的間隙。除此之外，這些敵人還可能威脅要使用大規模毀滅或擾亂性武器，操弄升高情勢風險。[5]這些行為都是利用外界認定的美國既有弱點，諸如兵力部署時間與距離、戰力維持不易，以及脆弱的基地、港口和指管網路。透過此種運作方式，敵人便可在美軍做出充分反應前，以製造既成事實獲致其目標。[6]

Adversaries have studied the manner in which the U.S. coordinates technical reconnaissance, satellite-based communications, and air and maritime power to enable ground freedom of maneuver and overmatch.[7] Highly advanced potential adversaries are developing methods to counter U.S. strengths in the air and maritime domain as well as degrading key capabilities by disrupting access to land, space, cyberspace, and the EMS. Adversaries will also use information warfare to influence U.S. decision makers and domestic and international sentiment. These methods conceivably turn long-presumed strengths in to potential weaknesses. As a result, the current U.S. comparative military advantage and the ability to conduct uncontested operations against a sophisticated enemy have diminished.

4 對立性規範包含日益強大的修正主義國家和特定非國家行為者，運用各種或所有力量要件，建立其本身對美國及其利益的規則。長期性混亂的點是許多弱國已經越來越沒有能力維持內政秩序或良好治理。支持此種評估結果的文件包含，the Joint Operating Environment 2035; Worldwide Threat Assessment of the U.S. Intelligence Community, Senate Select Committee on Intelligence, Feb 2016, Military and Security Developments Involving the People's Republic of China 2015, Annual Report to Congress; RAND, The Challenges of the "Now" and Their Implications for the U.S. Army.

5 大規模擾亂性武器包含網路攻擊或廣大區域的電磁脈衝攻擊。

6 所謂既成事實係指已完成且應無可逆性的事務。

敵人早已針對美國協同技術偵察、衛星通信、海空兵力投射，以確保地面行動自由及壓倒性戰力進行深入研究。[7]高度先進的潛在敵人，不斷發展各種反制美國海空優勢的方法，同時藉由妨礙美軍在地面、太空、網路空間和電磁頻譜等領域用兵作為，削弱其關鍵戰力。敵人同時也使用資訊戰左右美國決策者的意向和國內與國際輿論。這些方法都有可能將美國長久認定的優點變成潛在弱點。因此，美國現有相對軍事優勢和遂行剋制勢均力敵之敵人的作戰能力正在流失。

U.S. forces can no longer assume continuous superiority in any domain because potential adversaries have made strides to disrupt the effectiveness, or deny the use of U.S. combat capabilities. Increasingly complex air, land, sea, space, and cyber capabilities allow adversaries to potentially contest U.S. force dominance.[8] This situation is exacerbated by the optimization of ground and air forces towards counterinsurgency operations which further reduces the ability to effectively counter sophisticated threats. In contrast to counterinsurgency operations, future U.S. forces will likely confront the sensor-rich militaries of peer states that employ both massed and precision-guided munitions across the depth and breadth of highly lethal battlefields. U.S. forces must anticipate being contested in all domains across a vastly extended area of operations by enemies that possess systems that match or exceed existing U.S. ground combat capabilities.

美軍已無法再確保其能在任何領域之持續性優勢，因為潛在敵人在妨礙美軍戰力效能，甚或阻止其發揮方面，已有重大進展。敵人在日益複雜空中、地面、海上、太空和網路戰力不斷增強，使其得以具備挑戰美軍絕對優勢的潛力。[8]由於美國現有地面與空中兵力都是朝向在反叛亂作戰中戰力最佳化設計，導致其有效反制複雜威脅之能力進一步降低，而導致此種情況雪上加霜。相較於反叛亂作戰，未來美軍極可能遭遇實力相當國家擁有大量感測器的軍隊，在具高度殺傷力的戰場縱深與正面，運用大量的火力與精

7 壓倒性優勢之定義，係指直接或間接應用各種戰力或特定之戰術，防止或消弭假想敵運用其現有或預期裝備或戰術的力量。

8 《聯戰願景2020》文件要求應建立全方位絕對優勢，使美軍能利用各種專門針對特定情況所量身打造的部隊編組，配合太空、海上、陸上、空中與資訊等各領域管道與作戰自由，有效遂行立即性、持久性與統合性之作戰。達成此一目的之關鍵因素之一就是獲致所有領域及資訊環境優勢的能力。

準導引彈藥。美軍必須預判未來會在廣大作戰區域範圍的所有領域，面對敵人以相當或優於美軍現有地面戰力之各種系統進行全面之挑戰。

A critical concern for future U.S. operations is the loss of presumptive air superiority resulting from adversary advancements. The difficulty in achieving air supremacy, or even localized air superiority, against sophisticated adversaries has significant implications under current operational constructs.[9] Force designed for, and accustomed to, air supremacy will face significant challenges in executing effective and efficient operations such as close air support for ground combat, air reconnaissance, and air mobility. Thus, the emerging operational environment is significantly differenct from the recent past as adversaries challenge U.S. air supremacy.

美軍未來作戰的重大憂慮之一，就是因為敵人的進步導致喪失原本必然的空中優勢。面對複雜敵人難以獲致絕對空優，甚至局部空優的情況，對於既有作戰架構之運用有極大之影響。[9]原本設計要，或已習慣空中優勢的部隊，在執行諸如對地面部隊的密接支援、空中偵察和空中機動等高效能與高效率之作戰時，將面臨極大的挑戰。因此，成形中的作戰環境將與不久以前的世界大不相同，因為敵人必然會挑戰美軍的空中優勢。

More specifically, adversaries can contest U.S. air supremacy through the development of complex integrated air defense networks, missile capabilities, electronic warfare capabilities, and highly sophisticated 4th and 5th generation aircraft. In strategically important regions, the density of complex integrated air defense networks enables adversaries to contest or deny friendly air superiority from the ground, and the resilience and density of these systems means that even major strike operations against these networks may only achieve localized and temporary results.[10] Unless countered, these integrated air defense networks further complicate friendly ground combat operations by providing protection under which adversary

9 絕對空優之定義為空優掌握程度已達到假想敵無法在特定作戰地區內運用空中和飛彈威脅有效進行干擾。空優的定義則是一方兵力對空中戰鬥的支配程度，可使其在特定時空遂行作戰時，不受到空中與飛彈威脅的限制。

ground forces can operate relatively free from the effects of airpower. Provided the dispersion, deception, and camouflage inherent in their employment, current integrated air defense networks can inhibit effective targeting and prevent joint fires from striking throughout the depth of enemy fromations.

更明確而言，敵人可以發展複雜的整體防空網路、飛彈戰力、電子戰戰力和高精密之第4代與第5代戰機，挑戰美國的空中優勢。在重要的戰略地區，複雜整體防空網路的密度，可以讓敵人能從地面爭奪或消除友軍空中優勢，而此類系統的韌性和密度更意味著即使對其發動大規模打擊行動，也僅能獲得局部或暫時性效果。[10]但若不加以反制，這些整體防空網路還能進一步讓友軍地面作戰行動更為棘手，因為其所提供的防空掩護，可以讓敵軍地面部隊在相對不受空中武力影響的情況下遂行作戰。再加上地面用兵部署必然採取的疏散、欺敵及偽裝作為，現行的整體防空網路可以降低聯戰火力對敵軍全縱深編組進行有效目標獲得與打擊的效果。

Enemy missile capabilities provide another significant challenge to friendly forces by enabling deep strike without reliance on manned aircraft. Peer adversaries possess numerous, modernized ballistic and cruise missiles with ever increasing precision and speed threatening command and control nodes as well as maneuver and support forces and infrastructure. Complementing enemy missile capability are offensive electronic warfare capabilities, a fleet of fourth and fifth generation aircraft and the full range of armed and unarmed unmanned aerial vehicles, which provide additional highly capable methods for long-range strike and targeting, especially when facing limited U.S. ground-based air defenses. Designed under the presumption of friendly air and maritime supremacy, current U.S. ground forces require large-signature sustainment facilities and command nodes that are vulnerable to long-range missile and rocket attacks.

敵軍飛彈戰力可在不依靠人駕式戰機的條件下遂行深遠打擊，對友軍部隊構成另一種重大挑戰。實力相當對手擁有龐大的現代化彈道飛彈和巡弋飛彈，其日益提升的精確度與速度，對於指管節點、戰鬥部隊、支援部隊和基礎建設等皆是一大威脅。敵人的飛彈戰力還可透過攻勢電子戰戰力、各種第4代和第5代戰機，以及所有類型的武裝及非武

10 例如，俄羅斯在烏克蘭就曾運用此類系統獲致空優。

裝無人飛行載具，進一步增強其戰力，尤其在面對美軍陸基防空系統有限的情況下，更提供了各種極為強大的遠程打擊與目標獲得的手段。目前美軍地面部隊在設計上都是假設友軍可掌握海、空絕對優勢，因此都需要龐大規模的戰力維持設施及指揮節點，而這些卻都是非常容易遭到遠程飛彈和火箭攻擊的目標。

Similarly, adversary coastal defense cruise missile capabilities increase hazards to maritime maneuver by placing naval assets at risk. The extended range and increasing number of these adversary missiles, coupled with significant reductions in friendly air defense capabilities, place large and fixed airbases at risk and limits the ability to project air power. Adversary missiles, protected by an effective air defense network and sophisticated aircraft, compel U.S. forces to operate at greater ranges and in a more dispersed manner, placing a premium on command and control to effectively coordinate operations and provide persistent sustainment.

同樣地，敵人岸防巡弋飛彈的能力，也提高了海軍艦艇海上機動用兵的風險。這些敵軍飛彈不但射程更遠且數量不斷增加，加上美軍防空戰力大幅的下滑，導致大型固定的空軍基地亦受到威脅，限制了空中戰力投射的能力。這些敵軍飛彈在高效的防空網和精密戰機保護下，迫使美軍必須在更遠距離和更疏散的條件下作戰，使得有效協調各項作戰之指揮管制及戰力維持成為一大難題。

U.S. forces cannot assume unhindered access to any domain or the EMS required for current reconnaissance and command and control systems to function effectively. Adversaries are developing capabilities specifically designed to attack U.S. platforms, systems, and networks. U.S. currently possess limited countermeasures to such attacks that could severely limit friendly battlespace awareness by degrading reconnaissance; command and control systems; position, navigation, and timing (PNT); and disrupt force deployment activities and other logistics operations. The loss of assumed superiority in the air, maritime, space, and cyberspace domains severely inhibits the effectiveness of stand-off targeting and strikes. A lack of situational understanding, when coupled with adversary advances that threaten disruption of supporting fires, diminishes U.S. forces' ability to win major ground combat operations.

美軍不能再假設其於任何領域可以隨意進出，或目前偵察與指管系統功能所需之電磁頻譜能有效發揮作用。敵人所發展的各種戰力，就是專門用來攻擊美軍各式載臺、系統和網路。美軍目前對於這些降低偵察、指管、定位／導航／校時系統(PNT)，嚴重削弱友軍戰場狀況掌握，或是擾亂兵力部署活動及其他後勤行動的敵軍攻擊行為，反制手段不足。喪失原本擁有之空中、海上、太空及網路空間領域的優勢，將嚴重抑制美軍遠距目標偵測及打擊的效能。缺乏狀況之掌握，加上敵人的進步，可能對支援火力構成威脅，都將削弱美軍部隊打贏大型地面作戰的能力。

When coupled with the loss of assured superiority in other domains and more than a decade focusing on counterinsurgency, U.S. ground combat capabilities and capacities are out of balance to confront emerging conditions presented by potential adversaries effectively. Aging ground combat assets and the limited procurement of technologically advanced systems have created a situation in which adversary ground formation now have parity or overmatch with U.S. forces in capability and capacity. The U.S. is now at a marked disadvantage in the range, lethality, protection, and mobility of many ground-based weapons systems. For example, the latest generation of adversary combat vehicles offer equivalent, and in some cases, superior protection and lethality when compared to U.S. tanks, fighting vehicles, and amphibious vehicles. Furthermore, potential enemies have artillery systems with greater ranges and in greater quantity than comparable U.S. systems, as well as munitions with greater lethality. Some nations have demonstrated the ability to locate and identify targets with unmanned air systems (UAS) and mass long range fires with devastating effects.[11] Absent a modernized U.S. tactical air defense network as well as the ability to provide effective counterfire, adversaries may create overmatch by using their UAS to locate, track, and target exposed U.S. forces and facilities, and then employ massed direct and indirect fires to destroy vital assets and formations.

如果加上其他領域確定優勢的喪失，和10餘年來著重於反叛亂作戰的情況，美軍地面部隊欲有效面對潛在敵人所未能形塑的條件，已然失衡。日漸老舊的地面戰鬥裝備和先進科技系統的採購數量不足，都已造成敵軍地面部隊在戰力和能量上可與美軍匹敵或超越。美國目前許多地面武器系統的射程、殺傷力、防護力和機動力等方面，都已明顯

處於劣勢。例如，敵人最新世代戰鬥車輛的防護力與殺傷力和美軍的戰車、步兵戰鬥車和兩棲載具相比，至少不相上下，甚至在某些個案還優於美軍。不僅如此，多個潛在敵人的火砲系統不論就射程和數量而言都優於美軍同級系統，而且彈藥更具殺傷力。某些國家已展現其使用無人飛行系統尋找與確認目標的能力，且可集中大量遠距火力發揮毀滅性效應。[11]在美軍缺乏現代化戰術防空網路及提供有效反砲戰戰力的情況下，敵軍可以運用無人飛行系統搜尋、追蹤並標定美軍暴露的部隊及設施，再運用大量間接與直接火力，摧毀重要的資產和部隊。

Current adversary capability developments present an expanded battlefield that can contest U.S. forces from deployment to employment. Not only do U.S. ground combat forces lack sufficient capacity of capabilities, but they are also out of position to deter adversaries, assure allies, and deny or defeat enemies if hostilities start. The time required to deploy U.S. forces from distant locations forfeits the initiative to adversary conventional and unconventional forces. Complex defensive networks can disrupt flexible deterrent options and subsequent build-up of U.S. and allied combat power should deterrence fail. Given these conditions, forward-positioned air, ground, and maritime forces capable of persisting within the arc of enemy long range fires are a decisive factor in deterring adversary aggression.[12] These forces provide both a political deterrent as well as the ability to contest aggression unitil additional combat power can be deployed.

當前敵軍戰力發展已使戰場大幅擴張，使美軍從部署到用兵皆面臨挑戰。美軍地面部隊目前不僅缺乏充足的戰力，也無法嚇阻敵人、安撫盟邦，並在戰爭爆發時阻止或擊潰敵軍。美軍從遙遠部署兵力所需之時間，使主動權落入敵人的正規與非正規部隊手上。複雜的防禦網路可以阻礙彈性嚇阻選項的效果，以及美軍與盟軍戰鬥力量在嚇阻失敗時的大軍集結。基於這些條件下，可在敵軍遠程火力的範圍內，確保戰力的前進部署空中、地面和海上兵力，是能否嚇阻敵人侵略的決定性要素。[12]這些部隊不僅可做為政治嚇阻力量，也是後續部隊投入前阻止侵略的重要實力。

11 俄羅斯近期已在烏克蘭展現其有效在戰術部隊結合無人飛行系統偵察能力和遠程砲兵火力。

12 海上兵力係指在海面、水下或空中遂行任務，以爭取及利用絕對制海權、制海權或海上拒止和／或進行海上兵力投射的部隊。

Implications of the operational environment

Over the last 25 years, assumptions of air, land, maritime, space, and cyberspace domain superiority drove the doctrine, equipment, and posture of U.S. forces. These assumptions are proving to be invalid in light of recent changes to adversary capabilities, capacities, and approaches. Potential adversaries now possess capabilities that allow them to contest both the deployment and employment of U.S. forces in greatly expanded areas of operation, interest, and influence. U.S. forces are not organized, trained, equipped, and postured to properly contest emerging and potential threats. As a result, the freedom of action required to support U.S. policy, by deterring, and if necessary, defeating enemies is at risk.

作戰環境的影響

過去25年來，掌握空中、地面、海上、太空和網路空間領域優勢的假定條件，是美軍所有準則、裝備和部署的基礎。這些假定條件在近期面對敵軍戰力、能量和作法的改變，已經證明無效。潛在敵人目前擁有的戰力，已使其能在廣大的作戰地區、利益和勢力範圍，挑戰美軍的部署與用兵。美軍不論在編組、訓練、裝備和部署等方面，都不足以有效對抗各種新興與潛在威脅。因此，支持美國以嚇阻為主，必要時擊潰潛在敵人之政策所需行動自由，現在已面臨危險。

Military problem

U.S. ground combat forces, operating as part of a joint, interorganizational, and multinational teams, are currently not sufficiently trained, organized, equipped, nor postured to deter or defeat highly-capable peer enemies to win in future war.[13]

軍事問題

美軍地面戰鬥部隊為聯合軍種、跨組織及多國團隊一員，目前並無充分訓練、編組、裝備和部署可嚇阻或擊敗強大敵人，以贏得未來的戰爭。[13]

13 於下頁。

Solution synopsis

Multi-Domain Battle: Combined Arms for the 21st Century requires ready and resilient U.S. Army and U.S. Marine Corps combat forces capable of outmaneuvering adversaries physically and cognitively through the extension of combined arms across all domains.[14] Through credible forward presence and resilient battle formations, future Army and Marine Corps forces integrate and synchronize capabilities as part of a joint team to create temporary windows of superiority across multiple domains and throughout the depth of the battlefield in order to seize, retain, and exploit the initiative; defeat enemies; and achieve military objectives.

執行方案概要

「多領域作戰：21世紀兵種協同」需賴可跨越所有領域遂行兵種協同作為，在實體與認知行為運作能力上超越敵人的高戰備與高韌性美國陸軍及海軍陸戰隊作戰兵力。[14] 藉由可恃的前進部署兵力和強韌的作戰編組，未來美國陸軍和海軍陸戰隊將整合與統合所有戰力，配合其他聯戰團隊成員，創造多重領域和全戰場縱深的暫時性「優勢之窗」，以獲取、維持並利用主動權；擊敗敵人；進而達成軍事目標。

Multi-Domain Battle: Combined Arms for the 21st Century evolves combined arms methodology to include not only those capabilities of the physical domains, but also greater emphasis on space, cyberspace, and other contested areas such as the EMS, the information environment, and the cognitive dimension of warfare. Combined arms integrates capabilities in such a way that to counteract one, the adversary must become more vulnerable to another.[15] Application of combined arms form the air, land, sea, and space has proven to be a combat tested method for success. The incorporation of other domains and contested areas is necessary to confront the realities of the modern battlefield and to generate advantages not possible

13 跨組織係指美國政府部會；各州、屬地；地方和部落機關；外國政府機關；跨政府、非政府和商業組織(不含部隊)。

14 在認知面向的運作上超越敵人，係指運用資訊混淆敵人的狀況掌握與決策行為，藉此為聯戰部隊創造優勢。

through the application of combined arms solely in the air, land, or maritime domains. Multi-domain combined arms provide commanders numerous options for executing simultaneous and sequential operations using surprise and speed of action to present multiple dilemmas to an adversary in order to gain physical and psychological advantages, influence and control over the multi-domain operational environment. In executing this concept, air, ground, and maritime forces project power outward from land and sea into other domains and contested spaces to support U.S. freedom of action. Thus, U.S. forces strive to affect an adversary in both the physical and abstract domains creating dilemmas too numerous to counter.

「多領域作戰：21世紀兵種協同」白皮書在兵種協同作戰方法上的演變，不僅包含所有實體領域的各項戰力，同時更重視太空、網路空間及諸如電磁頻譜、資訊環境和戰爭認知面向等方面的競爭領域。經過此種方式進行兵種協同戰力整合後，敵人若欲在某一領域採取反制作為，則必然會在另一個領域上暴露弱點。[15]從空中、地面、海上和太空發揮兵種協同戰力，在過去已經實戰驗證為致勝的要件。因應現代戰場之實際條件，單靠運用空中、地面或海上領域戰力無法獲致優勢，必須結合其他領域與競爭性範疇的諸般戰力。多領域兵種協同戰力可使各級指揮官藉由奇襲與行動速度，提供實施同步與連續行動方面的諸多選項，使敵陷入各種左右為難的困境，以利掌握實體與心理優勢、戰場影響力及多領域的作戰環境。在執行此一概念時，空中、地面與海上兵力可從地面和海上向其他領域及競爭範疇投射戰力，以鞏固美軍的行動自由。因此，未來美軍的目標是在實體與抽象領域創造多到敵人無以反制的難題，以達到左右敵人行為的效果。

To generate and exploit psychological, technological, temporal and spatial advantages over an advaersary, ground combat forces must physically and cognitively outmaneuver enemies. This is achieved by holistically employing reconnaissance, movement, fires, and information to avoid surfaces, identify gaps, and create and exploit windows of advantage.[16] U.S. forces must simultaneously use signature control, defensive systems, and over-watch fires to establish temporary zones of protection for friendly forces to operate. The exploitation of gaps and seams in enemy intelligence, surveillance, reconnaissance, protection, and strike systems should be synchronized with the establishment of temporary protective zones for friendly

15 兵種協同係統合與同步應用各兵種部隊，以獲致遠大於各兵種單獨運用或接續運用時的效果。

forces. This should allow maneuver elements to sequence opportunistic action to exploit enemy vulnerabilities and seize positions of relative advantage.

為創造與利用超越敵人之心理、科技、時間與空間優勢，地面部隊必須在實體與認知行為運作上超越敵人。此舉須藉全般運用偵察、機動、火力與情資，避敵表面上之優勢、確認實際上之差距並創造與運用「優勢之窗」，方可望達成目標。[16]美軍部隊必須同步運用訊號管制、防禦系統和防護區。制壓火力，以建立友軍部隊作戰時所需之暫時性防護區。而在建立友軍暫時性防護區時，應同步利用敵人在情報、監視、偵察、防護和打擊系統方面的落差及間隙。此舉將使作戰部隊可以安排臨機性行動，以利用敵軍已暴弱點進而取得相對有利位置。

The Army and Marine Corps will meet the demands of future conflict by task-organizing units that are empowered with decentralized, multi-domain combined arms capabilities, these will be Marine Air-Ground Task Forces (MAGTF) for the Marine Corps and multifunctional battle teams for the Army.[17] These units must be flexible and resilient, with the ability to operate in degraded conditions and with sufficient endurance and redundancy to sustain losses and continue operating for extended periods and across wide areas. These formations may be task-organized at multiple echelons, depending on the situation and nature of the mission. The guiding principle is that they must be able to employ multi-domain combined arms capabilities at the lowest practical echelons to enable dispersed operations, thereby reducing vulnerabilities to enemy massed fires while maintaining the ability to rapidly aggregate to mass at decisive points to create overmatch. Mutually supporting dispersed tactical formations must possess organic capabilities to generate levels of localized domain superiority in the form of temporary zones of protection. The generated areas of control and periods of superiority are not sanctuaries; control is temporary and dynamic requiring ground combat forces to achieve surprise and sustain high tempo operations to open and exploit windows of advantage.

美國陸軍與海軍陸戰隊藉由單位任務編組方式，使部隊具備分權執行、多領域兵種

16 表面是硬點－為敵人的強點；而落差是軟體－係指敵人的弱點(MCDP 1)。

協同戰力，以因應未來的衝突，海軍陸戰隊係編組陸戰隊空地特遣部隊；而陸軍則是多功能戰鬥隊。[17]這些單位必須具備高度彈性與韌性，擁有在不足條件下長時間執行任務的能力，並具備援戰力可承受作戰損失，以利長時間在廣大區域遂行作戰。同時依狀況與任務本質不同，在多個層級進行任務編組。最高指導原則是，此種新型態部隊必須能在可行的最低層級運用多領域兵種協同戰力，以降低遭敵集中火力攻擊之脆弱性，並利維持在決勝點快速集中兵力以創造壓倒性優勢的能力。可相互支持的疏散戰術編組，必須擁有各種建制戰力，以便在暫時性防護區內創造不同層次的局部領域優勢。已建立之控制區和優勢時段並非完全無虞；這些暫時性與動態性控制權，需要地面戰鬥部隊發揮奇襲效果，並以快節奏作戰行動，開創並維持「優勢之窗」。

Components of the solution

Executing Multi-Domain Battle: Combined Arms for the 21st Century has three key components: create and exploit temporary windows of advantage, restore capability balance and build resilient battle formation, and alter force posture to enhance deterrence. Creating and exploiting temporary windows of advantage provides a means to achieve positions of advantage in or across domains, the EMS, and information environment to seize, retain, and exploit the initiative to defeat the enemy. Restoring capability balance and building resilient battle formations is essential to developing credible future forces capable of fighting and winning against sept and elusive enemies. Altering the force posture prevents conflict by providing a credible deterrence through the introduction of ground and maritime maneuver forces with multi-domain fires capabilities into positions of advantage that disrupt potential fait accompli strategies.

執行方案構成要件

落實「多領域作戰：21世紀兵種協同」的作法有3項要件：分別為創造與利用暫時性「優勢之窗」；恢復戰力平衡與建立強韌作戰編組；改變兵力配置以強化嚇阻。創造

17 多功能戰鬥編組是一種暫時性的兵種協同任務編組方式，擁有多領域兵種協同戰力，且在架構上最為適於完成特定任務。美國陸軍所研擬的多功能編組涵蓋多個階層，其組成和正式名稱仍未決定。

與利用暫時性「優勢之窗」提供了在各領域、電磁頻譜與資訊環境獲致有利地位的手段，以利美軍奪取、保持及利用主動以擊敗敵人。恢復戰力平衡與建立強韌作戰編組是建立能戰勝狡猾與飄忽敵人所需未來可恃強大兵力的基礎。改變兵力配置則是藉由引進擁有多領域火力的地面與海上作戰部隊，部署於可瓦解敵人製造既成事實戰略的優勢位置，提供可恃嚇阻效果，達到預防衝突之目的。

Create and exploit temporary windows of advantage

Future operational and tactical commanders will use cross-domain fires, using both kinetic and information warfare means, to enable the opening of successive and/or simultaneous windows of advantage in the physical and abstract domains. As such, the fundamentals of maneuver warfare remain valid with this concept. In cases where overmatch in troop strength or combat power is not possible, U.S. forces will create and exploit temporary windows of advantage in domains that provide the most decisive method for defeating an enemy rapidly. Such windows of advantage may facilitate maneuver to achieve positions of relative advantage in a physical domain or enable suppression of a capability in an abstract domain that is critical to enemy success. As adversaries contest joint forces in physical and/or abstract domains, U.S. forces will possess the ability to rapidly refocus effort and capitalize on successive and/or simultaneous windows of advantage.

創造與利用暫時性「優勢之窗」

未來野戰層級與戰術層級的指揮官將運用跨領域火力(包含殺傷性與資訊宣傳戰手段)，以利在實體和抽象領域開創連續及同步「優勢之窗」。因此，機動戰的基本原則對於此種概念仍屬有效。在某些創造兵力或戰力優勢已無可能的情況下，美軍部隊將會尋求在各種領域創造與利用暫時性「優勢之窗」，以提供迅速擊敗敵人的最具決定性方法。此種「優勢之窗」或許有助於幫助戰術作為奪取某一實體領域的相對優勢位置，或有助制壓某項攸關敵人作戰成敗的抽象領域戰力。當敵人在實體以及抽象領域和美軍聯戰部隊對抗時，美軍將擁有快速改變作戰重點並集中戰力於連續及同步「優勢之窗」的能力。

Opening a domain window may require combinations of integrated, synchronized, and sequenced capabilities, to include capabilities provided by other U.S. agencies, other military components, or foreign partners. The timing of cross-domain fires and maneuver is predicated on the duration the window of advantage is required to achieve the desired objective. Friendly forces may exploit windows of advantage to disrupt or dislocate the enemy by using simultaneous ground and sea-based maneuver along with other multi-domain capabilities. U.S. forces may employ multi-domain capabilities to attack the enemy's critical capabilities through the most vulnerable physical or abstract domain. Capitalizing on these windows of advantage, ground and maritime forces use speed and surprise to seize, retain, and exploit the initiative. The mission dictates how future combat forces will apply these capabilities as there is no default approach; every mission requires reevaluation of where vulnerabilities exist or can created because adversaries are adaptive.

開啟某個領域的「優勢之窗」需要同時運用各種整體性、統合性及連貫性戰力，包含其他美國各部會、其他軍事部門、甚或外國夥伴所提供之戰力。跨領域火力與戰術作為使用之時機，係取決於獲致所望目標所需「優勢之窗」的持續時間。友軍部隊可能會利用這些「優勢之窗」，運用同步地面與海上戰術作為，配合其他多領域戰力，遏阻或驅逐敵軍部隊。美軍則可能針對敵人最脆弱的實體或抽象領域，運用多領域戰力攻擊其關鍵戰力。地面與海上兵力充分運用這些「優勢之窗」，以速度和奇襲奪取、維持並運用主動權。戰鬥部隊未來運用這些戰力的方式，完全取決於任務，因為其並無律定之基本作法；每一次執行任務時，均須重新評估弱點存在或可以利用的位置，因為敵人必定會依情況不斷調整。

Fire and maneuver forces coordinate, plan, and execute fire support tasks to defend the force from attack and surveillance, and create exploitable lethal and nonlethal effects to support a scheme of maneuver. Fire and maneuver places enemy igh value assets at risk compelling him to either increase his vulnerability by remaining in range or abandon his position, losing any advantage. When enemy countermeasures to air power and precision fires (such as dispersion, concealment, deception, and intermingling with civilian populations) limit the effectiveness stand-off fires capabilities, ground-based fires and maneuver augment other joint capabilities providing the commander with additional options.

火力與機動部隊須協調、規劃與執行各種火力支援任務，以避免部隊遭敵攻擊或偵察，同時創造可資利用的殺傷性與非殺傷性效果，以支援機動作戰之遂行。火力與機動對敵軍高價值資產所構成的威脅，將迫使其陷於若續留射程內將導致弱點增大，但若放棄既有陣地則將喪失優勢的窘境。當敵軍對空中武力和精準火力採取各項反制措施(諸如疏散、掩蔽、欺敵和混跡於平民人口之中)，造成遠距火力戰力效能降低時，地面火力與機動部隊加強其他的聯合戰力，以提供聯戰指揮官額外選項。

This concept calls for the integration of physical fire and maneuver with the abstract capability of information warfare. Information warfare spans several capabilities and functions such as: military information support operations, military deception, operations security, electronic warfare (EW), physical attack, special technical operations, information assurance, computer network operations, public affairs, and civil-military operations. Information warfare capabilities provide the opportunity to compete with adversaries early, below the threshold of armed conflict. When information warfare is integrated with kinetic fire and maneuver, commanders will be better equipped to outmaneuver an adversary by degrading his command and control, disrupting weapons and intelligence, surveillance, and reconnaissance systems' functionality, and impacting key audience perception and activities beyond the application of physical power.

此種概念必須將實體火力與機動作為和資訊戰抽象戰力予以整合。資訊戰涵蓋多種戰力和功能，諸如：軍事資訊支援作戰、軍事欺敵、作戰安全、電子戰、實體攻擊、特種技術作戰、資訊確保、電腦網路作戰、公共事務和軍民作戰等。資訊戰力可在未跨越武裝衝突門檻下，提供與敵人競爭制敵機先之機會。當將資訊戰與殺傷性武力和機動作戰結合，指揮官將更有能力削弱敵軍之指管、打亂其武器運用和情監偵系統功能，並在不使用實體戰力的條件下左右關鍵對象認知和行為，使敵無以為鬥。

Ground-based fires and information warfare, integrated with air and maritime power, support the achievement of localized sea and air control. Deep fires, including long-range precision fires, cyber and electronic warfare capabilities, and counter-fire capabilities help create windows of advantage across all domains. These windows of advantage enable the joint force to seize the initiative and dominate enemy forces through the execution of opportunistic

maneuver in contested and highly competitive peer/near peer environments.

地面火力與資訊戰，與空中及海上戰力整合後，可支援奪取局部海、空之掌握。深遠的火力，包含長程精準火力、網路與電子戰戰力、以及反砲戰戰力等，都有助於在所有領域創造「優勢之窗」。這些「優勢之窗」有助於聯戰兵力奪取主動，並可透過在對抗環境及與實力相當對手作戰之高度競爭性環境中，伺機而動，以左右敵軍。

Army and Marine Corps forces, whether employing ground, air, or sea-based maneuver, seek to exploit windows of advantage to close with the enemy, overcome enemy countermeasures, compel outcomes, and consolidate gains. These forces provide lasting effects because they offer endurance and are difficult to displace once in position. Combat units offer many options. One option is to conduct turning movements behind the enemy's main line of defense to attack critical targets.[18] Another option is when enemy communications and reconnaissance are degraded by multi-domain operations, ground and maritime forces can infiltrate through dispersed enemy positions to attack from unexpected directions, emplace multi-domain fires in positons of advantage and destroy vital facilities to disrupt the enemy's defenses by attacking enemy fire support, air defense, sustainment, and command and control systems.[19] While this concept reinforces the fundamentals of maneuver warfare by advocating attacking where the enemy is weak, forces must possess the capability to create advantage through the application of combined arms in the physical and abstract domains to defeat enemy forces with equivalent combat power. The multitude of methods of creating and exploiting temporary windows of advantage highlight the capabilities necessary for future Army and Marine forces to conduct Multi-Domain Battle: Combined Arms for the 21st Century.

美國陸軍與海軍陸戰隊，不論採取地面、空中或海上機動，都在於發掘迫近敵軍、克服敵軍之反制、促成所望戰果和鞏固已獲戰果的「優勢之窗」。這些部隊由於具持久作戰能力且在占領根據地後即難以驅離，因此可發揮持續性效果。戰鬥部隊可有許多不同的選項。其中之一是對敵軍主陣地帶實施迂迴，攻擊重要目標。[18]另一個選項是當敵

18 迂迴是一種戰術作為，攻擊部隊會設法避開敵人主要防禦陣地，奪取敵人現陣地後方的目標，藉此迫使敵軍部隊離開既有陣地或調派主力應付此一威脅(FM 3-90-1)。

軍通信與偵察能力遭美軍多領域作戰削弱時，地面與海上部隊可以從敵軍疏開的陣地滲透，並從不意方向加以攻擊，在優勢位置部署多領域火力並摧毀其重要設施，藉攻擊敵軍火力支援、防空、戰力維持及指揮管制系統等，瓦解敵軍之防禦。[19]雖然此種概念是主張攻擊敵軍弱點，進一步發揚機動戰的基本原則，但各級部隊須先擁有應用實體與抽象領域兵種協同作戰創造優勢之戰力，才可望擊敗戰力對等之敵軍。創造並利用暫時性「優勢之窗」的各種方法，凸顯出未來美國陸軍與海軍陸戰隊之落實《多領域作戰：21世紀兵種協同》白皮書時所需之各種戰力。

Restore capability balance and build resilient battle formations

Empowering U.S. ground combat forces to fight effectively against sophisticated enemies demands restoring parity or providing capacity overmatch in critical capabilities. Attaining parity entails restoring, at a minimum, equivalency of warfighting capabilities. Achieving parity also requires improving survivability against attack, resiliency, and the endurance to not only survive, but to execute operations post-attack. Improving survivability, resiliency, and endurance will inevitably require capabilities to operate more dispersed over diverse operational environments. Employing the capabilities described here is anticipated to restore overmatch in critical areas to provide the depth, resiliency, and endurance needed for success. With these capabilities, ground and maritime forces ashore will be able to operate in the physical and abstract domains to sense, close with, and destroy enemy elements, influence and protect populations, and seize and occupy or control terrain to consolidate gains.

恢復戰力平衡與建立強韌作戰編組

給予美軍地面戰鬥部隊充分力量，以有效對抗各種複雜敵人，在重大戰力方面必須

19 滲透是一種戰術作為，攻擊部隊會採取不被偵知的運動方式，通過或進入敵軍部隊占領之陣地，以利在敵軍陣地後奪取有利位置，同時僅讓小部分兵力暴露於敵火之下(FM 3-90-1)。大型部隊在執行滲透時不可能完全不被偵知。運用先進反情報、偵察和情報戰力、欺敵作為、偽裝、掩蔽及其他相關技巧，是確保降低遭敵偵知和成為攻擊目標的成功關鍵所在。

恢復對等或提供超越之能量。達到對等意味著至少須將作戰能力恢復到概等程度。對等同時還必須提升抵禦攻擊的存活率、韌性，以及不僅能存活，且能於遭攻擊後遂行任務的持久能力。提升存活率、韌性與持久能力也無可避免地需要建立能於更多元作戰環境中執行更具分散式作戰的戰力。運用此處所敘述的各種戰力，應先恢復關鍵領域方面的優勢，才能提供戰勝敵人所必需之縱深性、韌性和持久性。地面與海上登陸兵力在擁有這些戰力之後，才能在實體與抽象領域遂行作戰，以偵知、迫近及摧毀敵軍部隊、影響與保護群眾、同時奪取和占領(或控制)重要地形，以鞏固既有戰果。

Ultimately, Army formations and MAGTFs will be task organized to the lowest practical level with capabilities that enable multi-domain distributed or semi-independent operations minimizing the need for enablers from higher echelons of command. Dispersed operations necessitate leaders, Soliders and Marines capable of using mission command tenets such as initiative to exploit opportunities or respond to unexpected threats within the commander's intent. Army formations and MAGTFs will conduct distributed maneuver with the ability to aggregate and disaggregate combat power to respond in time and space to defeat enemy elements.

更重要的是，陸軍各級部隊和海軍陸戰隊空地特遣部隊，須能以任務編組方式，使最低實際層級擁有各種戰力，以遂行多領域分散式或半獨立作戰任務，將要求上級指揮機關提供輔助手段的需求降至最低。分散式作戰所需之各級幹部、陸軍官兵和陸戰隊員，必須能落實任務式指揮基本原則，諸如主動追求戰機或在指揮官企圖內處置不預期的威脅。陸軍和海軍陸戰隊空地特遣部隊將以戰力集中與分散能力，適時適地因應，以擊敗敵軍。

Improvements in protection, mobility, range, and lethality of key systems will help create advantages allowing ground combat forces to maneuver in close proximity to civilian populations and defeat enemy forces in close combat. Active protection, advanced armor, and hardened electronic systems will improve units' ability to absorb and survive first strikes of enemy fires. Maneuver units will also increase survivability and capacity by employing manned-unmanned teaming (MUM-T).[20] MUM-T will provide personnel protection by using autonomous or robotic systems to detect, identify, and penetrate high risk areas and may

increase capacity to degrade, deny, and destroy enemy systems.

重要系統防護力、機動力、射程和殺傷力的提升，將有助於創造各種優勢，使地面戰鬥部隊能在平民群眾近在咫尺的地區內遂行作戰，並在近接戰鬥中擊敗敵軍。主動式防護、先進裝甲和強化型電子系統，將可提升部隊對敵人火力第一擊的承受力和存活率。作戰部隊亦可藉由有人／無人組合(manned-unmanned teaming, MUM-T)提高存活率與作戰能量。[20]此種編組方式可以運用自主式或機器人系統，偵知、確認與滲透高風險作戰區，提高人員防護力，同時亦可提高削弱、遏阻及摧毀敵軍系統的能量。

To prevent adversary aviation, UAS, artillery, and missile assets from striking with impunity, forces will employ a highly mobile and robust air and missile defense systems to counter long range fires in both forward and rear areas. These systems will provide early warning, identification, and strike capability and require adequate capacity to counter multiple air sorties or repetitive missile salvo fire to provide defense in depth. Mounted and dismounted friendly elements will have organic capabilities to counter adversary UAS, aircraft, rocket, artillery, and mortar capabilities providing increased survivability and allowing varying levels of freedom of maneuver.

為了防止敵人的飛機、無人飛行系統、火砲和飛彈資產遂行肆無忌憚的攻擊，我軍將運用高度機動與強大防空與飛彈防禦系統，在前方與後方地區反制敵軍長程火力。這些系統將提供早期預警、敵我識別及打擊戰力，且須建立充分能量，建構縱深防禦體系，以有效反制敵空中多批次或連續飛彈飽和攻擊。乘車與下車友軍單位須擁有建制戰力，以反制敵軍無人飛行系統、戰機、火箭、火砲和迫砲等戰力，有效提升存活率並創造不同層次機動的自由。

Army formations and MAGTFs will possess a family of UAS for reconnaissance, surveillance, and attack missions, often teamed with fifth generation aircraft, possessing the range, endurance, protection, low observability, EW resistance, and lethality necessary to operate across the area of operations. As part of the future formations, vertical lift will support

20 在未來作戰環境中，美軍部隊往往在數量上處於劣勢。運用機器人和自主性系統有助提升可抵銷敵軍數量優勢的戰力。

reconnaissance, attack, air assault, medical evacuation, and utility roles. Future vertical lift will provide increased speed, range, and survivability to support dispersed forces over wider areas, better operability in degraded visual environments, and the capability for employing precision munitions to include air to air capabilities. Improved aviation protection and countermeasures including infrared and radar frequency gun and missile system detect and defeat, and EW detection, jamming, and attack will enhance survivability in highly contested airspace. Employing future vertical lift with MUM-T also will increase capacity, reach and survivability.

陸軍各級部隊與海軍陸戰隊空地特遣部隊將擁有一系列的無人飛行系統，負責偵察、監視及攻擊任務，通常還會搭配擁有航程、耐航力、防護力、低視度、抗電子戰干擾及殺傷力等於所有作戰區域執行任務所需條件的第5代戰機。在未來作戰編組中，垂直起降機將可支援偵察、攻擊、空中突擊、醫療後送和通用任務。同時也將擁有更高的速度、航程與存活率，以支援分散於廣大區域內的部隊，在視度不佳的環境中具備更好的作戰能力，以及使用包含空對空飛彈在內的各式精準彈藥。改良式陸航防護與反制措施，包含紅外線與雷達頻率火砲暨飛彈偵測與反制，而電子戰偵測、干擾與攻擊則可強化部隊在高度對抗性空域中的存活率。未來垂直起降機型搭配有人與無人機組合，也可提高作戰能量、範圍與存活率。

Conceptually, maneuver formations will capitalize on the increased capability of multi-domain future systems. Army formations and MAGTFs will have an expanded spectrum of organic and attached lethal and nonlethal fires, some with extended range systems as the mission dictates. Multi-domain and counter-fire sensors improve the commander's situational understanding, and enable rapid neutralization or destruction of enemy systems or forces. Organic cyberspace and EMS sensors, EW attack and jamming capabilities, and automated electromagnetic battle management capabilities allow tactical formations to attack or disrupt enemy systems while minimizing vulnerabilities of friendly systems. Such capabilities will generate tempo by creating temporary windows of advantage in physical and abstract domains.

就概念而言，作戰部隊將利用多領域未來系統增強之能力。陸軍各級部隊與海軍陸戰隊空地特遣隊將編制更廣泛類型的建制與配屬殺傷性及非殺傷性火力，某些還可依任

務需求編制增程型系統。多領域與反砲兵感測器，可提升指揮官的狀況掌握能力，同時使其能快速瓦解或摧毀敵軍系統或部隊。建制網路空間與電磁頻譜感測器、電子戰攻擊與干擾能力，以及自動化電磁頻譜戰場管理系統等，都使戰術層級部隊可有效攻擊或擾亂敵軍系統，同時將友軍系統的脆弱性降至最低。此類戰力皆可在實體與抽象領域創造暫時性「優勢之窗」，達到發動作戰節奏之目的。

A renewed degree of emphasis must be placed on electronic emissions control and other measures of signature management. In future conflicts, every force should expect to be targeted quickly and precisely if unable to manage its signatures. Unmanaged signatures will be a critical vulnerability as peer competitors experiment with emerging technologies such as advanced detection methods, hypersonic platforms and directed energy weapons. Minimizing or masking system signatures through concealment and deception will complicate enemy targeting and build resiliency and endurance of U.S. forces. These capabilities are reinforced through counter-intelligence capabilities, social media discipline, covered networks, low-profile basing, and a stealthy logistics infrastructure.

未來必須更強調的重點應在於電子發射管制及其他訊號管理措施。在未來的衝突中，若無法管理其他的發射訊號，所有部隊都應預想自己會快速且精確地成為目標。由於實力相當競爭者不斷研究諸如先進偵測方法、超高音速載臺和指向性能量武器等新興科技，缺乏管理的訊號將成為一項致命弱點。透過隱藏與欺敵等作為將系統訊跡降至最低或予以遮蓋，將使敵人更難實施目標偵測，且可強化美軍部隊的韌性與持久力。這些戰力還可透過反情報能力、社群媒體規範、隱藏性網路、隱匿性基地設置，以及秘匿後勤基礎設施等作為予以強化。

Headquarters and subordinate units alike must be capable of operating effectively despite severe degradation of command and control networks to include disrupted or blocked access to space, cyberspace, and the EMS. Optimized command and control systems in redundant, survivable, and highly mobile command posts allow forces to operate despite enemy attempts to attack, disrupt or degrade command and control infrastructure. Automated decision tools resident in command and control systems will analyze, filter, and report information helping commanders make informed decisions faster. Future units will maintain communications

and PNT through an internal communication network for maneuver, fires, and sensors that is resilient and self-healing, that is, able to re-route data and communications to the intended recipient, to minimize disruptions and support command and control while moving.[21] This internal network will limit susceptibility to detection and countermeasures, potentially using line of sight transmissions such as laser and other hard to detect frequencies supported by high altitude retransmission assets. Integrated and optimized command and control systems will support external connectivity to global support networks that will allow dynamic partnering between Army and Marine forces and other mission partners.

各級指揮部與所屬部隊都必須具備在指揮管制網路遭嚴重阻礙的條件下，包括太空、網路空間和電磁頻譜等遭擾亂或封鎖，有效地遂行任務。使用具有備援、存活力與高度機動力的指揮所，以發揮最佳效果的指管體系，可使部隊在遭遇敵軍設法攻擊、擾亂或削弱指管基礎設施時，仍能遂行任務。指管系統內建之自動化決策工具，應負責分析、過濾與回報各種資訊，以協助指揮官更快速下達決心。未來的部隊應透過內部機動、火力與感測器通信網路，維持通信及定位、導航與對時功能，此一系統必須具備韌性與自我修復功能，亦即其須能重新調整線路，將數據通信傳輸給所望接收者，以降低干擾影響，並支援機動中的指管作為。[21]此種內部網路可以降低遭敵偵測與反制的脆弱性，通常使用雷射等使用直線傳輸及其他由高空轉發資產所支援之難以偵知頻率。整合式與最佳化指管系統可支援對外鏈結全球支援網路，以利陸軍與海軍陸戰隊及其他任務夥伴進行動態合作。

Reducing vulnerabilities inherent in deployment and sustainment activities also supports resiliency of U.S. forces. Dispersed, distributed, and resilient force deployment and sustainment using multiple lines of communications will reduce vulnerability to interdiction. Shallow draft transport vessels, amphibious transport capabilities, short take-off and landing aircraft, and future vertical lift capable of intertheater transit allow entry into austere locations and expeditionary advanced bases providing the commander more options. Autonomous sustainment tools will perform predictive analysis allowing supplies to be pushed forward

21 內部網路係指單位用於進行對內通信的系統。外部網路係指單位對外通信使用之網路，諸如與上級單位、鄰接友軍和其他夥伴的連絡網路。

to units. Using unmanned aerial resupply systems augments the capacity of limited manned systems allowing faster supply operations over dispersed areas and increasing combat capability of engaged units.

降低部署與戰力維持活動的脆弱性，也有助於提升美軍部隊作戰韌性。運用多條交通線遂行疏散式、分散式與強韌之兵力部署與戰力維持作為，可降低遭敵截擊的脆弱性。可執行戰區內運輸任務的濱海運輸艦、兩棲運輸艦艇、短場起降戰機和未來垂直起降機型，可支援惡劣地形與遠征前進基地運輸，讓指揮官有更多的選擇。自主式戰力維持工具可執行預測性分析，讓補給品可以主動前運至各單位。運用無人飛行補給系統補強有限的人駕式系統，則可提高疏散區域運補作業的速度，提高接戰中單位的戰鬥能力。

Sustainment forces will conduct convoy operations employing MUM-T techniques with ground transport vehicles. Demand reduction efforts will create units that need less fuel, energy, water, and other supplies. Additive manufacturing capabilities will allow units to make repair parts in forward areas.[22] Simplified maintenance (such as line replaceable units) allows repairs at forward locations by the operators, reducing the need to move equipment to higher echelons for repairs. Additionally, forces will have enhanced prolonged care capability at the point of injury to increase personnel survivability because of potential higher casualty numbers against peer threats and possible delays in medical evacuation due to force dispersion.

戰力維持部隊在使用地面運輸車輛執行車隊運送作業時，亦可採取有人／無人組合的作法。需求降低作為將可創造出某些使用更少燃料、能源、水源及其他補給品的單位。附加製造能力讓各單位可以在前線自行製造保修料件。[22]簡化保修作為(諸如使用現場可更換件)使作戰部隊可在前線陣地進行修復作業，降低將裝備後送上一級保修廠庫修復的需求。此外，各部隊未來還將擁有戰場傷患長期照護能力，以提高人員存活率，而這主要考量未來在部隊疏散的情況下，對抗實力相當威脅可能造成更高的傷亡率，且醫療後送也可能受到拖延。

22 積層製造技術(亦稱3D列印)係指可以透過逐層累積材料製造3D物件的科技。

Alter force posture to enhance deterrence

U.S. forces are not adequately postured or equipped to deter peer competitors from acts of aggression effectively. This deficiency requires deliberate examination of the forward stationed, rotational, and sea-based expeditionary forces. While long-range strikes or nuclear weapons offer strategic deterrence, adversaries often employ methods to achieve objectives that operate below the thresholds for employ these weapons. Robust enemy defensive networks impose limitations on the effectiveness of stand-off strike capabilities. Ground and maritime forces provide multiple options. Army forces stationed overseas and Marine Corps forces forward deployed afloat can deter enemy actions and reassure partners providing commanders with the capability to challenge enemy networks, in an effort to prevent enemies from achieving their objectives. Ground and maritime forces are also expeditionary and strategically mobile, able to rapidly aggregate to contingencies or reinforce forward deployed formations.

改變兵力配置以提升嚇阻效果

美軍目前在兵力配置與裝備方面，並未針對有效嚇阻實力相當競爭者採取侵略行為的情況進行充分考量。此一缺陷需要周密檢視前進駐防、輪調式和海基遠征兵力現況。雖然長程打擊或核子武器具有戰略嚇阻效果，但敵人通常用於達成其目標的方法，都是在避免跨越這些武器使用的門檻下運作。強大的敵軍防禦網路對長程打擊戰力的效能構成諸多限制。地面與海上兵力可提供多種選項。駐防海外的陸軍部隊和艦隊前進部署的陸戰隊部隊，可以提供指揮官挑戰敵人網路的必要戰力，達到嚇阻敵人行為與安撫夥伴國家之目的，此皆是希望能防止敵人達成其目標。地面與海上兵力同時也具備遠征型態和戰略層次的機動性，可快速針對各種應變狀況集中兵力，或增援前進部署單位。

Ground forces communicate U.S. commitment prior to and during conflict. In the future, Army and Marine forces working with partners will strengthen forward defenses by bolstering partner capacity and resolve to resist aggression and dissuading adversaries who employ methods below the threshold for war. When possible, Army forces may be stationed permanently in identified high risk areas, or move uncontested into allied or partner nations

prior to the outbreak of hostilities through exercises or regular rotations. Army forward stationed forces and Marine sea-based forward presence are complementary. Using the sea as maneuver space and expeditionary advance bases, Marine forces will distribute for activities with partners and rapidly aggregate to deter adversary escalatory actions. Security cooperation activities assure partner states, build relationship and interoperability, enhance situational awareness, and set favorable conditions for inserting follow-on expeditionary forces if diplomacy and deterrence fail.

地面部隊在衝突前與衝突期間都能傳達美國的承諾。未來，陸軍與海軍陸戰隊部隊與各夥伴國軍隊合作，透過增強夥伴能量及其抵抗侵略的決心，勸阻妄圖採取不超越戰爭門檻達成目的之敵人，有效強化前進防衛力量。在可能的情況下，陸軍可以永久駐防某些已確認的高風險區域，或在敵對行為爆發前，以演習或定期輪調方式，在無對抗條件下進駐盟邦或夥伴國家。陸軍前進駐防兵力與海軍陸戰隊海上前進駐軍，具有相輔相成的效果。海軍陸戰隊以大海做為運動空間和遠征前進基地，可以分駐各地執行與夥伴國的活動，並可快速集中兵力嚇阻敵人升高情勢的行為。安全合作活動可提供夥伴國保障、建立關係與共同作戰能力、加強狀況掌握，並塑造後續遠征兵力在外交與嚇阻手段失效時投入的有利條件。

Having a ground and maritime combat capability prior to hostilities disrupts enemy defensive networks, turning denied areas into contested spaces. Forward-positioned Army and Marine forces that can persist in the arc of enemy fires deter adversary aggression by restricting adversarial freedom of action and influencing the enemy in all domains and contested areas. Forward-positioned and resilient multi-domain fires capabilities provide additional deterrent value by hold at risk enemy centers of gravity. Should deterrence fail, these resilient forward-positioned forces can conduct delaying action to enable maneuver of additional forces into theater.

在敵對行為爆發前先期部署地面與海上戰力，可以擾亂敵人的防禦性網路，將遭拒止區域變成對抗性空間。可在敵人火力制壓下維持戰力的前進駐防陸軍與海軍陸戰隊兵力，藉由限制敵人行動自由與影響所有領域和對抗區域內的敵人，可達到嚇阻侵略的效果。前進駐防與強韌多領域火力戰力，對於敵人作戰重心的威脅，也同樣具有嚇阻價值。一旦嚇阻失敗時，這些強韌的前進駐防兵力可以執行遲滯行動，以利後續

部隊投入戰場。

Conclusion

This paper is intended to promote discussion on solutions to overcome the problems of future conflict 2025-2040, inform the development of a future warfighting concept, and drive experimentation and refinement of these solutions. Building on current service and joint doctrine, Multi-Domain Battle: Combined Arms for the 21st Century evolves the combined arms methodology to include not only those capabilities of the physical domains, but also those of abstract domains such as cyberspace, the EMS, the information environment, and the cognitive dimension of warfare. It provides not only recommendations towards suggested capabilities to be at a commander's disposal to defeat and enemy, but also a new framework for understanding the expansion of the 21st Century battlefield. Such understanding and capabilities are necessary if U.S. forces are to be successful in future conflict.

結　　論

本文之目的在於促成各界探討克服未來2025～2040年衝突問題的各種解決方案，以做為發展未來作戰概念的依據，並促成這些解決方案的驗證與精進。在既有軍種與聯合作戰準則的基礎上，「多領域作戰：21世紀兵種協同」係將兵種協同方法擴大到實體領域戰力之外的抽象領域戰力，諸如網路空間、電磁頻譜、資訊環境和戰爭認知面向等。其所提出之建議不僅針對指揮官擊敗敵人所需之各種必要戰力，也包含瞭解21世紀戰場範圍擴大的一套新架構。美軍若欲在未來衝突中剋敵制勝，就必須具備此種瞭解和戰力。

資料來源：2017年2月24日

United States Army Training and Doctrine Command

(網址：tradoc.army.mil/MultiDomainBattle/docs/MDB_WhitePaper.pdf)