

Multinational Fires in a Multi-Domain Environment

多國部隊在多領域環境下之火力運用

取材：美國《聯合火力》雙月刊2019年9-10月號
(Fires, September-October 2019)

作者：法國陸軍中校 Nicolas Konieczny

譯者：朱子宏

前言

After more than a decade dedicated to counterinsurgency operations, the Western armies are reviewing their structures, organizations and missions and modernizing their equipment to be able to face another kind of threat that can compete with the national capabilities and create strong challenges; especially regarding stand-off and anti-access air denial.

西方世界的陸軍在過去十餘年時間內，致力於叛亂份子肅清作戰，刻正檢視其組織架構與任務，並加速武器裝備現代化，當其面對其他國家所帶來的威脅與強勢挑戰；特別是面對具有遠距防空與反空域介入能力的對手時，得以從容對應。

In this new environment, the French Army has issued a new concept, “future land action,” while the U.S. Army is focused on “multi-domain operations (MDO),” both pointing out the requirement to better coordinate their capabilities in the different domains. This also includes the requirement to interact more with the multinational partners in order to provide additional capabilities, authorities and different tactical possibilities on the battlefield to deceive and defeat an enemy that will never be able to adapt to multiple approaches and unexpected combined effects.

在新興的作戰環境下，當美國陸軍致力發展「多領域作戰」的同時，法國陸軍近期發布「未來地面行動」的新興作戰概念。兩者不僅均強調跨領域整合能力，也強調必須強化與多國部隊的互動，進而於戰場上發揮額外的戰力、獲取更多的指揮權限並以不同的戰術來誘殲達軍，因為敵人在面對多重的手段與奇正並用所帶來的戰術效果時，將無所適從。

Therefore multinational interoperability is key more than ever. For the “Fires”

warfighting function it was the opportunity to test it during Joint Warfighting Assessment (JWA) 19, especially within the JAGIC of the 7th Infantry Division commanded by Lt. Col. Nicolas Konieczny, French liaison officer to the Fires Center of Excellence with a team composed of the U.S. Army, Marine Corps (1st Anglico), Navy, Air Force, Australian and Singapore officers and NCOs.

因此，多國合作間所需的互通能力較過去更為關鍵。2019 年「聯合作戰評估」演習，為檢視「火力運用」機制的契機，尤其是由法國陸軍派駐火力卓越中心的聯絡官尼可拉斯·柯尼齊尼中校，所率領之第七步兵師下轄的聯合空地火力整合中心，中心成員包括了美國陸軍、海軍陸戰隊第一海空火力聯絡連、海軍、空軍、澳大利亞籍與新加坡籍的軍、士官，如圖一。

1. Joint Warfighting Assessment 19

一、2019 年「聯合作戰評估」演習

The JWA is the Army's capstone, multi-echelon exercise intended to demonstrate and assess future force concepts, capabilities and formations required to operate on the battlefield of the future. JWA 19 incorporated training formations from I Corps, 7th ID, Australia, Canada, New Zealand and the United Kingdom and personnel augmentation from France, Singapore and joint forces operating in a live, virtual and constructive environment to assess the implementation of MDO captured in Training and Doctrine Command Pamphlet 525-3-1.

「聯合作戰評估」為陸軍的重大演訓，藉由各層級的演訓來展示並評估未來戰場上的用兵思維、作戰能力與編裝。2019 年「聯合作戰評估」演習的參演單位包括了美軍第一軍、第七步兵師、澳大利亞、加拿大、紐西蘭與英國等部隊，人員部份更包含法國、新加坡與聯合部隊成員。於真實、完整與動態的操演環境中，對美國訓練與準則發展指揮部的 525-3-1 手冊中的多領域作戰概念之運用，進行整體評估。

During this exercise, the 7th ID became a multinational U.S.-led division augmented by French, Australian, Singapore, British and Canadian officers and NCOs and had to fight as a Joint Forces Land Component Command (JFLCC) under a Combined Joint Task Force (CJTF, I Corps).

操演期間，第七步兵師在美軍幹部的帶領下，納入法國、澳大利亞、新

加坡、英國與加拿大籍軍、士官，轉化成為多國聯盟的師級聯合地面作戰部隊（Joint Forces Land Component Command，JFLCC），受聯合特遣部隊（Combined Joint Task Force, CJTF）(第一師)指揮。

The JWA 19 operational environment was focused on the 2028 future environment integrating future capabilities (Multi-domain Task Force, hypersonic weapons, strategic long-range cannon, precision-strike missile and extended-range cannon artillery for the U.S. Army, 1st Strike Brigade with Ajax and future equipment for the United Kingdom). The scenario depicted was aimed to challenge a coalition led by the U.S. Army against a peer-threat competitor equipped with a large amount of long-range artillery assets (both field and air defense artillery) and able to use non-lethal Fires (mainly cyber and electronic warfare).

2019 年「聯合作戰評估」演習，著重於 2028 年的未來作戰環境，並納入未來的作戰能力（多領域特遣部隊、超音速武器、戰略型長程火炮、精準打擊飛彈與管式砲兵射程增程等，均為美國陸軍與英國第一打擊旅未來所要驗證的編制與裝備）。操演想定設計係為了磨練美國陸軍為首的同盟部隊，如何面對具備大量長程砲兵火力（野戰砲兵與防空砲兵）與非致命火力（主要為網路戰與電子戰）的強勁敵人。

In this multi-domain environment and in close cooperation with the multinational partners, the “Fires Enterprise” was the main pillar to enable freedom of maneuver for the 7th ID commanding general and his subordinates, while contributing to the exploration of new procedures and policies in order to create more lethality and efficiency on the battlefield.

在多領域環境與多國夥伴緊密合作的狀態下，「火力機構」藉由嶄新的作業程序與政策，在戰場上獲取更為致命的打擊效果，成為保障第七步兵師指揮官與所屬部隊作戰行動自由的關鍵。

2. Joint Air-Ground Integration Center evolution in a multi-domain environment

二、聯合地空火力整合中心在多領域環境中的革新

The U.S. Army in MDO in 2028 states that no single service component alone can overcome the layered standoff from a peer adversary. Consequently the joint force needs to converge capabilities to generate synergistic effects to counter the enemy's

standoff capability.

依據「美國陸軍多領域作戰 2028 願景」一書中所敘，沒有單一軍種能夠獨自戰勝具有遠距打擊能力的對手。因此，聯合部隊需要整合各項戰力，進而淬鍊出統合戰力，反制敵人遠距打擊能力。

Delineation of responsibilities and adaptation of coordination measures

1. 火力運用權責分明與協調手段的調整。

The challenge for the coalition was first to delineate the responsibilities between the operational and tactical commands and define the successive areas of operations in order to attrite the high priority targets at echelon and create the conditions of transition between echelons. Therefore, due to the lack of global air superiority, the Fires Enterprise was in charge of degrading, denying, disrupting and destroying the enemy capabilities to enable the commitment of the maneuver forces.

對於聯合部隊的第一個挑戰就是必須明訂作戰與戰術層級指揮部之權責，並且清楚界定其作戰範圍，進而能夠區分各層級的目標優先順序並且建立各層級之間攻擊目標轉移的條件。因此，在缺乏全球性的空中優勢的條件下，火力機構扮演著耗損、拒止、擾亂與摧毀敵軍能力的重責大任，進而保障兵力之運用。

To enable this delineation, the traditional fire support coordination measures (FSCM) and air control measures (ACM) had to be adapted before and during the exercise. In addition to the fire support coordination line and coordination fire lines, the JFLCC area of operations forward boundary became a FSCM between the JFLCC and CJTF. For the air coordination measures, the coordinating altitude had to be raised up to 35,000/40,000 feet (instead of the 20,000 feet initially planned) to leverage the commitment of multinational long-range Fires assets.

為了能夠使火力運用上能夠權責分明，傳統的火力支援協調措施與空中管制手段必須於演習直前完成。除了火力支援協調線（Fire Support Coordination Measures ,FSCM）與火力協調線（Coordination Fire Lines）外，聯合地面作戰部隊作戰範圍之前沿一線做為聯合地面部隊與聯合特遣部隊之分界，傳統部隊與多國部隊火力協調管制手段，如圖二與圖三。

在空中管制措施部份，為了能夠肆應多國部隊的長程火力裝備能力，協

調管制高度由原本的 20,000 英呎提升為 35,000 與 40,000 英呎。

Lethal and nonlethal Fires

2. 致命與非致命火力

The high number of targets (the opposite forces were almost double our forces) and the multinational capabilities/authorities required to process the Fires planning/coordination through the Targeting Decision Board (TDB) led by CJTF commander. This TDB integrated not only the lethal capabilities (surface-to-surface, air-to-surface) but also the nonlethal capabilities (space, cyber, electronic warfare, Military Information Support Operations, Public Affairs/Civil Affairs). At the JFLCC level, the decision was made to adapt the Army targeting cycle into a reviewed joint targeting cycle in order to include these additional capabilities and create multi-domain effects-based operations (MDEBO). These were a combination of effects throughout the use of space, cyber, EW, surface-to-surface Fires, close air support, unmanned aerial system, attack helicopters aimed to deceive/disrupt the enemy capabilities and protect the coalition forces.

目標數量眾多（敵軍數量為幾乎我軍兩倍之多）且相關權責的劃分，需要由聯合特遣部隊指揮官所主持的目標審定會議（Targeting Decision Board），來進行後續火力計畫發展與協調。目標審定會議不僅整合致命火力（地對地、空對地），更包含了非致命火力（太空、網路、電子戰、軍事資訊支援作戰、公共事務與民事等）。在聯合地面部隊層級，目標的審定係藉由是於已完成的聯合目標處理程序中，納入陸軍目標處理程序，藉以涵蓋額外的能力並且打造出多領域效能作戰（Multi-Domain Effects-Based Operations, MDEBO）。此效能係運用太空、網路、電子戰、地對地火力、空中密接支援、無人飛行系統、攻擊直升機等來誘敵/擾敵，進而保護作戰部隊。

Multi-domain and multinational integration

3. 多領域與多國整合

The multi-domain environment determined the JAGIC:

多領域環境為主的聯合地空火力整合中心

●To operate more with the foreign liaison officers within the JFLCC in order to synchronize the Fires support with the different steps of the multinational brigades

operations (forward passage of lines, wetgap crossing);

●To engage directly with the Multi-domain Task Force and adapt if required by the MDEBOs according to dynamic targeting processes.

●強化與聯合地面作戰部隊中的外國聯絡官互動，在不同國籍的旅級部隊，同時執行不同作戰任務時（如超越攻擊與渡河作戰等），得以整合各級火力進行支援。

●依據動態的目標處理程序，在為了達成多領域效能作戰目的下，得以直接運用多領域作戰特遣部隊。

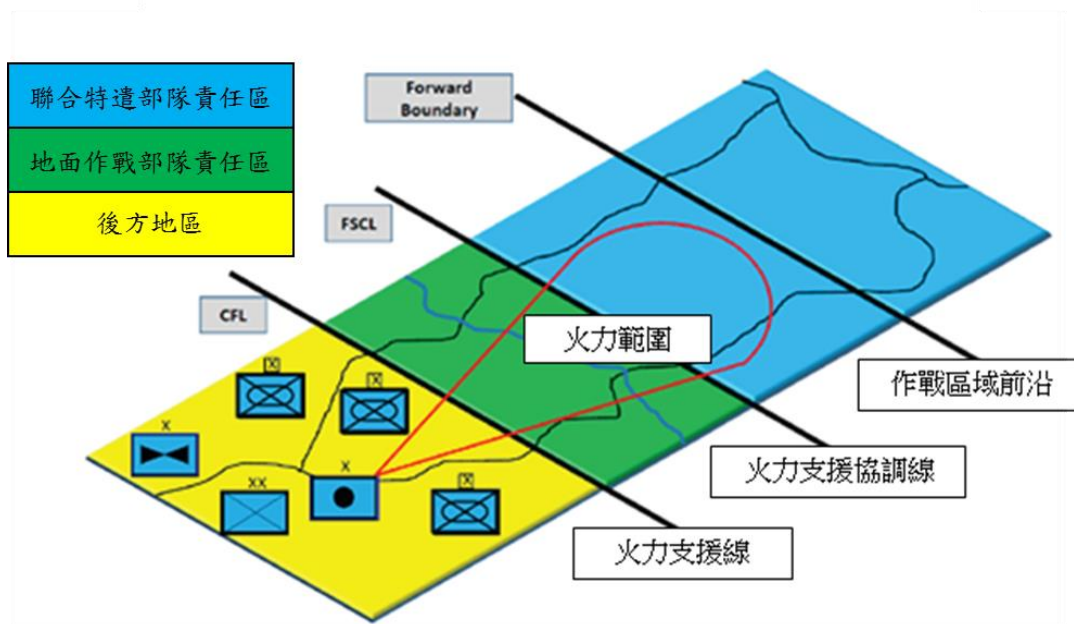
More than ever the multinational JAGIC became the central core of the coordination and execution of all the Fires, lethal and nonlethal. The JFLCC was in charge, in close coordination with G2 and G3, to assess the Go/No Go conditions and then the applicability of the MDEBOs to support the maneuver units. It also muted to become a larger entity integrating some aspects of a NATO joint fire support element or a French fire support coordination cell (designation of a deputy to the JAGIC chief, JAGIC commitment in the Targeting Working Groups) and more important synchronizing the MDEBOs throughout the entire exercise. This adaptation was made possible thanks to the experience of all the joint and multinational actors and created the conditions of success for the JFLCC.

多國聯合地空火力整合中心為全般致命火力與非致命火力協調與運用的核心。由聯合地面作戰部隊主導，在與情報處與作戰處的密切協調下，評估是否能執行多領域效能作戰並能有效支援戰鬥單位。其不僅可以整合北大西洋公約組織（North Atlantic Treaty Organization, NATO）火力支援單位或是法國火力支援小組（派遣人員擔任聯合地空火力整合中心副主任，聯合地空火力整合中心亦為目標作業團隊的一部）。更重要的是，得以藉由演訓全程來整合多領域效能作戰。這個組成不僅可以帶給聯合或多國部隊帶來可貴的經驗，也可以為聯合地面作戰部隊創機造勢。聯合地空火力整合中心成員配置圖，如圖四。



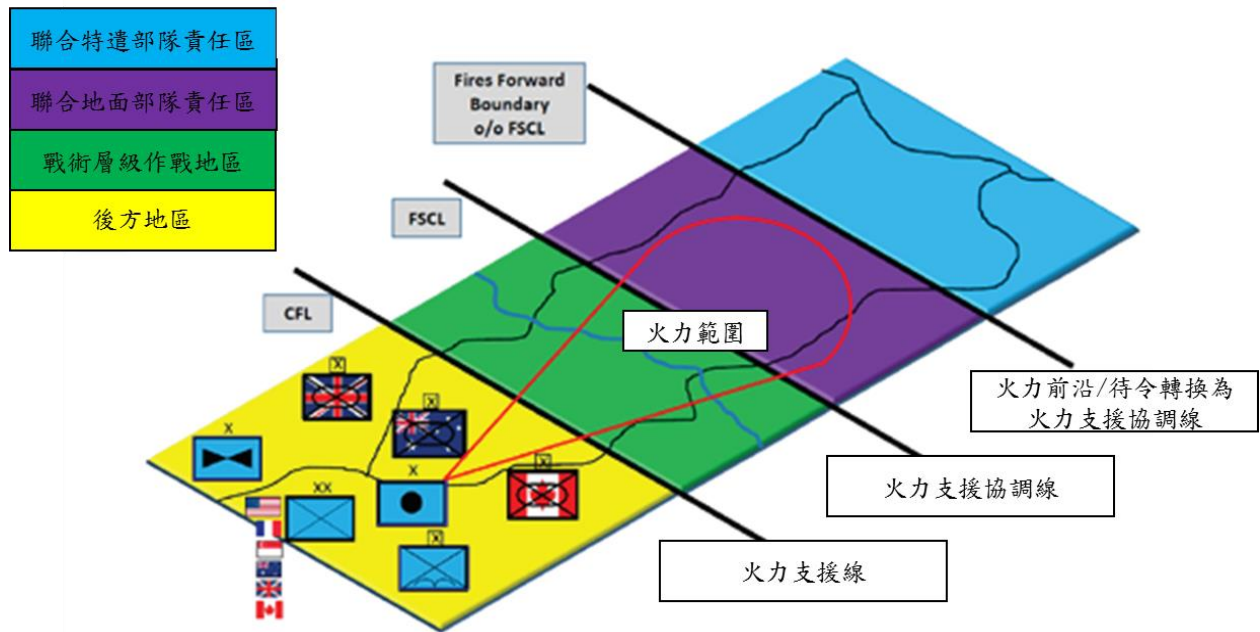
圖一 2019 年「聯合作戰評估」，聯合地空火力整合中心成員合影

資料來源：Nicolas Konieczny, “Multinational Fires in a multi-domain environment”, *Fires*, September-October 2019, p.47, <https://sill-www.army.mil/firesbulletin/archives/2019/sep-oct/articles/11.pdf>



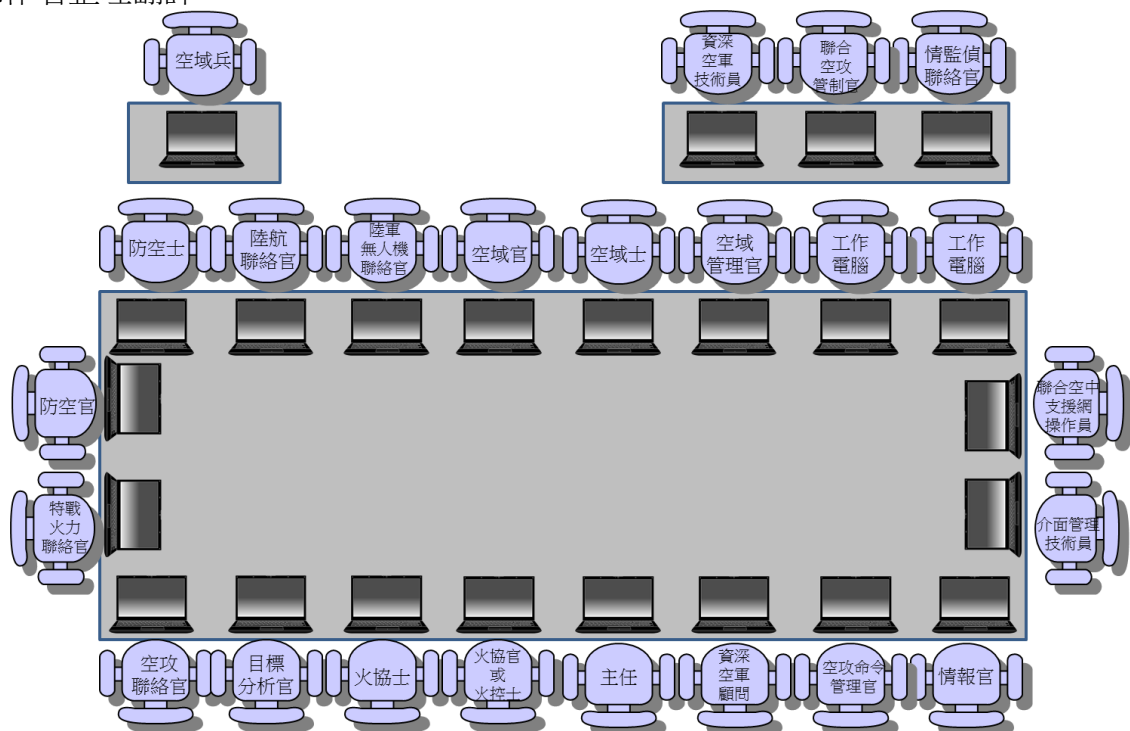
圖二 傳統火力支援協調手段示意圖

資料來源：1.Nicolas Konieczny, “Multinational Fires in a multi-domain environment”, *Fires*, September-October 2019, p.48, <https://sill-www.army.mil/firesbulletin/archives/2019/sep-oct/articles/11.pdf> 2.作者整理翻譯。



圖三 多國部隊火力支援協調手段示意圖

資料來源：1.Nicolas Konieczny, “Multinational Fires in a multi-domain environment”, Fires, September-October 2019, p.48, <https://sill-www.army.mil/firesbulletin/archives/2019/sep-oct/articles/11.pdf> 2.作者整理翻譯。



圖四 聯合地空整體火力中心成員配置圖

資料來源：1.Nicolas Konieczny, “Multinational Fires in a multi-domain environment”, Fires, September-October 2019, p.48, <https://sill-www.army.mil/firesbulletin/archives/2019/sep-oct/articles/11.pdf> 2.作者整理翻譯。

3. Interoperability with multinational partners

三、與多國部隊的互通性

During the whole exercise, the main challenge was to get the appropriate level of interoperability between all the joint and multinational entities throughout the Multi-domain Command and Control tools in order to operate between the JAGIC and the subordinate commands. In order to harmonize the processes, the decision was made to use the U.S. procedures primarily even if every country had to comply with its own national Fires doctrines and rules of engagement.

演習全程，最主要的挑戰是運用多領域指揮與管制手段，適切地在所有的聯合與多國部隊找出其與聯合地空火力整合中心與下級部隊的互通模式。即便每個國家都有其火力運用的準則與接戰規定，為了能使整個指揮程序更為和諧，在決心下達部份仍以美軍慣用的程序為主。

Technical interoperability

1. 技術互通性

In a NATO environment, the Digital Fires Systems rely mainly on Artillery Systems Cooperation Activities (ASCA) to enable a full compatibility between the multi-national partners, like in Dynamic Front or Joint Warfighting Assessment 18.1 with the French 7th Armored Brigade and the German 23rd Mountain Infantry Brigade under the 1st ID.

在北約的作戰環境下，多國部隊數位化火力運用系統主要仰賴砲兵整合系統（Artillery Systems Cooperation Activities, ASCA）來整合，如與法國第七裝甲旅共同執行的「動力前線」演習或是與德國第一步兵師第 23 山地步兵旅共同執行的 2018 年第 1 號「聯合作戰評估」演習。

During JWA 19, the Digital Fires Systems used at the JAGIC level with the multinational brigades were mainly U.S.: Advanced Field Artillery Tactical Data System (AFATDS), Tactical Airspace Integration System and Air and Missile Defense Workstation. The 1st Strike Brigade tried to connect Fire Control Battlefield Information System Application to AFATDS via ASCA but unfortunately the connectivity was not permanent. Some technical difficulties appeared as well with the Australia and New Zealand Brigade due to a different version of AFATDS. Finally

almost all the countries got U.S. Army Digital Liaison Detachments to operate the three systems.

2019 年「聯合作戰評估」演習中，聯合地空火力整合中心與多國部隊作戰旅的數位化火力運用系統，係使用美國先進砲兵戰術數據系統（Advanced Field Artillery Tactical Data System, AFATDS）、戰術空域整合系統（Tactical Airspace Integration System, TAIS）與飛彈防禦系統（Missile Defense Workstation）。雖然英國第一打擊旅嘗試用砲兵整合系統來將其所研發之戰場火力管制資訊系統（Fire Control Battlefield Information System Application）與美國先進砲兵戰術數據系統進行鏈結，但是，很不幸地，雙方的資訊鏈結時常中斷。一些技術的互通問題也發生在澳大利亞與紐西蘭的身上，起因為兩者使用的先進砲兵戰術數據系統版本不同。最終，幾乎所有的單位都前往美國陸軍數位化聯絡辦公室去操作上述的三個美軍系統。

In the future, Defender 20 in Germany will demonstrate the requirement to enhance the use of ASCA and possibly variable message format to get a full connectivity between the different national Fires systems. For airspace control and air and missile defense systems, there is still room for improvement to get a full interaction between NATO and other systems as pointed out during this exercise.

在 2020 年，捍衛者演習即將於德國舉行，將會著重於提升砲兵整合系統之運用，並且將藉由不同的資訊傳遞格式，建立起不同國家火力系統之間的慣常鏈路。如同文中所述，北約國家與其他國家在空域管制與防空系統建立起完整鏈結的領域，仍然有長足的進步空間。

Procedural interoperability

2.程序互通性

As mentioned previously the procedures were mainly connected to U.S. standards but the multi-domain environment and the requirement to experiment the MDO concept allowed the JAGIC to develop additional tactics, techniques and procedures in order to cover the nonlethal Fires applicability as well as a deeper involvement in the planning phase. The NATO and ABCANZ (America, Britain, Canada, Australia, New Zealand, also known as Five Eyes) procedures and standards were used to develop new approaches like the targeting process, which – from the initial Army targeting

cycle – became more joint and even almost NATO (question on the redefinition of the target to include the “key leaders”).

同前所述，主要的作業程序仰賴美軍的標準，但是在多領域環境與多領域作戰概念的需求趨使下，聯合地空火力整合中心發展額外的戰術、技術與程序來涵蓋非致命火力的運用，並且於計畫階段中投入更多的心力。北約與美國、英國、加拿大、澳大利亞與紐西蘭所成立的五眼聯盟（America, Britain, Canada, Australia, New Zealand, ABCANZ），其現行的程序與標準被用來發展新的目標處理程序 – 係以美國陸軍目標處理程序為基礎，成為了全北約國家通用的聯合目標處理程序(其中包含名詞的重新定義，如關鍵領袖)。

One major point to be covered at the JAGIC level with multinational partners is related to the rules of engagement and caveats. Every country was in charge to identify a “Red Card Holder” within their own headquarters but it never happened during the exercise that he had to intervene due to the fact that the CJTF and JFLCC rules of engagement were very clear and there was always a constant dialogue between the key leaders (ABCANZ) and within the Fires Enterprise.

在聯合地空火力整合中心與多國部隊間，重要的考量點之一為接戰規定與限制。每個國家都有自己的不可侵犯的底線，然而在這次演習中都沒有任何國家的底線被踰越，因為聯合特遣部隊與聯合地面部隊所訂定的接戰規定非常明確，除了五眼聯盟中的領導者均保持慣常通聯外，火力機構之間也保持慣常通聯。

Human interoperability

3.人員互通性

More than fully compatible systems and well managed standard operating procedures, JWA 19 success relied primarily on the excellent human interaction. The integration of a French officer as the JAGIC chief of a multinational division was initially a gamble but proved to be an overall success emphasized by Maj. Gen. Willard M. Burleson, 7th ID commanding general, at the end of the exercise. This multinationality triggered a lot of discussions in order to adapt and review the structures, organizations and missions in a new operational environment. It also facilitated the exchange of information in the G3 and JAGIC with a better

understanding of the operations conducted by the multinational brigades according to their doctrine and rules of engagement and then an appropriate Fires support fitting their requirements.

除了系統的高度相容性與妥善管控的標準作業程序外，2019 年「聯合作戰評估」演習的成功，主要在於優異的人員互動。演習直前，任命法國軍官擔任多國部隊師所下轄的聯合地空火力整合中心主任，被認為是個賭注。但是，在演習結束後，第七師指揮官威拉德·伯勒森（Willard M. Burleson）少將強調這個調度是成功的。此多國演習觸發了許多關於新興作戰環境下針對組織、架構與任務的相關討論，進而進行調整與檢討，同時也藉由多國作戰旅的作戰部門與聯合地空火力整合中心的資訊交換，使其對於整體作戰中的準則運用、接戰規定與適切的火力支援需求更為了解，如圖五。



圖五 多國部隊人員於 2019 年「聯合作戰評估」演習中的小組會談

資料來源：Nicolas Konieczny, "Multinational Fires in a multi-domain environment", *Fires*, September-October 2019, p.50, <https://sill-www.army.mil/firesbulletin/archives/2019/sep-oct/articles/11.pdf>

結論

As NATO Secretary Gen. Jens Stoltenberg mentioned at the NATO summit in Brussels, July 2018, the Alliance is “stronger together.” This applies perfectly to the

MDO concept and the new threats which require enhanced interoperability, to mutualize the efforts, to combine the capabilities and to share different approaches in order to more efficiently degrade, deny, disrupt and destroy the potential adversaries.

如同北約秘書長嚴斯·史托騰伯格將軍（Jens Stoltenberg）於 2018 年 7 月在布魯塞爾舉行的北約高峰會中所言，同盟就是「共同茁壯」。這番言論完美詮釋了多領域作戰概念與面對新興威脅時需要提升互通性、雙向交流成效、結合各方能力並且分享不同的做法來有效地耗損、拒止、擾亂與摧毀潛在的對手。

譯者心得與啟示

多領域作戰未來勢必成為西方世界國家發展準則與強化各領域統合訓練的趨勢。無論是美軍提出的多領域作戰，還是文中作者提到法國陸軍發展新的作戰概念「未來地面行動」，均強調進行多領域作戰直前，必須能夠統合跨領域的打擊能力，並且強調多國作戰或聯盟作戰的互通性。然而聯合火力支援、協調與管制成為了形塑戰場的關鍵。在美國兩百多年以來的歷史，將砲兵定調為主導戰場的戰場之王（King of Battle），隨著時代的進步與軍事事務革新的推動，戰場之王從原本的砲兵也進化成文中所提及之火力機構，其火力打擊手段涵蓋了多領域中的致命火力與非致命火力。然而，由於多領域戰場環境的重疊，火力運用期間，縝密運用安全管制手段與措施更成為了將火力極大化，附加損害極小化的重要途徑。無論是單一國家的聯合作戰或是兩國以上的多國作戰，每個軍種或是每個國家的管制措施均有差異，如何考量個別的能力與限制，訂定出統一的管制措施，降低作戰風險，提升火力打擊效能，也是火力機構需要仔細琢磨的課題。

此外，作者藉由本文點出在指揮管制數位化的趨勢與未來身處多領域戰場環境的條件下，要遂行多國聯合作戰的時候面臨到的各項細部問題，特別是在聯合火力運用上，是否能夠為戰鬥部隊開啟致勝的先機，發揮統合戰術，無論在跨系統的鏈結、不同國家的作業程序統一與各國人員的專長搭配都必須仔細考量，尤其是面對具備遠程打擊能力敵人，稍有協調連絡或是指揮管制系統的瑕疵，可能就會對所屬的部隊與單位帶來巨大的威脅與傷害。

我國礙於軍事外交與地緣之限制，很難有機會與邦交國和盟國進行聯合演訓，更遑論進行跨異國系統之鏈結，無論是使用介面或是系統的相容度，

都需要長期的測試與磨合。此外，無論是軍事術語、準則用語以及最基本的溝通語言，都是執行多國聯合演習的參演國必須要事前完成協調聯絡的項目。然而，國軍現行的各項演習，無論是三軍聯合演習、跨軍種聯合操演抑或是兵種協同演習，其實都是為了爾後奠定多國聯合演習或作戰的基本功。因此，我國在建軍備戰與奠定聯戰基礎的階段，可以藉由本文所提供的多國演習經驗，思考跨國（軍種）之指揮管制系統與數位化火力運用系統是否能夠整合、資訊傳遞格式是否能夠相容、作業程序是否能夠統一將可以成為未來進行軍事投資、教育訓練、準則發展或者是科技研發的依據。

作者簡介

Lt. Col. Nicolas Konieczny, the French liaison officer to the Fires Center of Excellence, has been involved in the major exercise Joint Warfighting Assessment 19 (May 2019) as Joint Air Ground Integration Center chief for the 7th Infantry Division (7th ID).

尼可拉斯·柯尼齊尼中校，法國派駐火力卓越中心聯絡官，參與 2019 年 5 月所舉行的「聯合作戰評估」，擔任第七步兵師聯合地空火力整合中心主任。

譯者簡介

朱子宏中校，美國色岱爾軍校 2007 年班、美國陸軍指揮參謀學院 2018 年班、政治大學戰略與國際事務所碩士、美國陸軍指揮參謀學院軍事理論碩士；歷任排長、測量官、教官、連長、外事連絡官，現任職於陸軍教育訓練暨準則發展指揮部。