



INITIAL-ENTRY CAPABILITY

FOR THE ENGINEER REGIMENT IN SUPPORT OF THE ARMY OF 2020

初始技能：給工兵團支援陸軍 2020 年

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The Army of 2020 (A2020) will be an expeditionary Army with perhaps only 1 percent of its forces stationed outside the continental United States. The tenets of A2020 (to include AirSea battle, sea basing, antiaccess, and area denial) are parts of what will become the new “normal” for the Engineer Regiment. While the A2020 will be required to perform offense, defense, stability, and defense support of civil authorities operations, it can perform none of these functions if conditions are not set for the initial entry (IE) of forces. These are challenges that have not been encountered by U.S. forces from an infrastructure perspective since the establishment of the Cam Ranh Air Base during the Vietnam War and from the area denial perspective since the landings at Normandy Beach during World War II. The engineers serve as the Army’s “Swiss Army knife” and must be able to perform a multitude of missions ranging from infrastructure to area denial and the entire range of engineer operations. The purpose of this article is to broadly frame the problems that engineers will face in setting conditions for A2020 success, to

show the hard work being performed at the U.S. Army Engineer School and Regiment to solve these problems, and to solicit assistance from the Regiment in shaping those solutions.

陸軍於2020年將會是一支大約只有1%駐紮在美國本土以外的遠征軍，而其宗旨(包括海空戰鬥、海中陣地、反制進入及區域阻絕)對於工兵團而言，將會變成新的常態。而陸軍2020年所須要表現的是攻擊、防禦、維和、民眾防衛作戰支援，但如果沒有初始技能的想定設計，將無法表現出這些功能。從公共建設的觀點來看，美軍在越戰期間，建造金蘭空軍基地，以及從區域阻絕觀點來看，第二次世界大戰的諾曼第登陸，這些都是美軍從未遭遇的挑戰。工兵自詡為陸軍“瑞士軍刀”，必須有執行多重任務之能力，不管是公共建設、區域阻絕還是全範圍工兵作戰。本文之目的為廣泛匡列出工兵即將面對的問題，為陸軍2020年成功做想定，展現出工兵學校與工兵團對解決這些問題的努力表現，並徵求工兵團協助擬定解決之道。

Initial Entry

The IE of forces must be seen in varying contexts. The IE of forces that support a contemplated area of operations may be in a land-based or littoral area. Each has vastly different circumstances for the engineer problem set. Another variable is the type of mission that will be performed, leading to one of the following three scenarios:

初始技能

部隊之初始技能常在不同的文章出現，例如支援一處稠密作戰區域，可能在陸地或灘岸地區，這與工兵設定的環境有極大的不同，另外的差異是即將執行任務的種類，這導致以下三種想定之一：

- A Phase 1, 2, or 3 fight, possibly facing aggressive antiaccess and area denial measures that might include deliberate defense in depth and complex layers of improvised explosive devices.
- A deployment to the scene of a humanitarian episode such as a genocide. The deployment may not include active-defense measures, but infrastructure at such sites may be less than optimal to support insertions by air or sea.
- A deployment that supports homeland-based defense support of civil authorities or humanitarian assistance/disaster relief such as the Haiti earthquake recovery in 2010, where forces encountered heavily damaged airport and seaport facilities.
- 第 1-3 階段作戰可能面臨具侵略性的反制進入及區域阻絕手段，可能包括周密縱深防禦及複雜的急造爆裂物層次。
- 人道事件場景之部署，像是集體屠殺。部署也許不包含主動的防禦手段，但海空在這些地方的公共建設投入可能比理想來的少。

■民間當局或人道協助/災害救援之國土防衛支援部署，像是 2010 年海地地震復原，當時部隊面臨機場與海港設施嚴重損毀。

In these scenarios, engineers will set the conditions for the joint force commander to meet these challenges. The variables of time, infrastructure, and enemy situation figure into the calculus of how to seize a lodgment, expand it, and set conditions for follow-on forces and the generation of combat power. The brigade engineer battalion (BEB) serves as the mobility/countermobility/survivability solution at the point of need for the brigade combat team commander in those initial stages. They are part of the tooth in the tooth-to-tail ratio; but in setting the theater, engineers at echelons above brigade (EAB) also help generate the tail needed to develop and sustain combat power. In the IE challenge, it is imperative to realize that the engineers serve as both tooth and tail.

在這些想定中，工兵要為聯部隊指揮官預設狀況來處理這些面對的挑戰。時間、公共設施及敵情的變數，計算出如何占領陣地、擴張、設想後續投入的兵力及戰力增長。旅工兵營提供旅戰鬥隊指揮官在這些起始階段中的需求點機動力/反機動力/生存力之方法，他們是領頭羊。但是在設定戰場中，工兵旅級以上階層也幫忙在後方部分產生的發展需求與戰力維持，在這初始技能的挑戰中，必須要瞭解工兵要首尾兼具。

Knowledge of the Theater

Only about 5 percent of the earth's surface is digitally mapped. Any IE capability must include adequate geospatial capability at the planning headquarters, with sufficient data for the identification of land masses or sea areas and a situational understanding of enemy behavior there. This is a critical geographic intelligence function that may develop for years after IE.

戰場知識

地球上只有5%的地表被數位化製圖，在計畫總部中，任何初始技能都必須包含足夠的地理空間能力，以足夠的資料來辨別陸地區塊或海域，以及對敵軍行動狀況之瞭解，這是個重要的地理情報功能，這須經過好幾年的培養產生。

Conditions for IE capability must also be set through a cultural understanding, ranging from the individual level, to the indigenous tribe/group/leader level, to the diplomatic/ political level. The engineer participating in humanitarian construction as part of an overarching theater security cooperation plan may also be years ahead in setting conditions for eventual IE operations. Those humanitarian projects that remain may partially set infrastructural conditions for later IE operations, ranging from simple structures and well drilling to the dredging of ports. This is the act of “setting the theater” and must be ongoing and continuous, planned, and routinely resourced.

初始技能的狀況假定也必須設定對於文化的理解，範圍從個別層級至當地

部落/團體/領導階層，或者外交/政治階層。工兵在參與人道建設中，為支配戰區安全合作計畫之一部，這也會在往後幾年成為最終初始作戰之假定，這些保留的人道專案也會部分設定為往後初始作戰之基礎建設狀況，範圍從簡單的結構到訓練精良的港口疏濬，這就是「戰場設定」的行動，必須持續不斷地計劃與精進。

Operational energy will also set conditions for the employment of any force to assure IE operations. As technologies develop that decrease the need for fossil fuels, their successful employment will be critical. If the logistical footprint can be decreased appreciably, it will make more lift available for IE and create leaner supply lines for the duration of operations.

作戰能量也同樣會被設定在任何兵力運用中，以確保初始作戰完整性，當技術發展降低石油所需時，成功的兵力運用將非常重要，如果後勤輜重可以明顯地被降低，這將使初始技能獲得更大的提升，並在作戰期間創造更倚賴的補給線。

The last portion of situational understanding of a particular area is engineer interoperability with special operations forces that may have been in the theater long before declared hostilities. Engineers must anticipate the needs of those forces by establishing habitual relationships through training and try to establish dedicated engineer assets to support their operations (possibly in the form of an engineer special operations force support squadron).

對特定區域狀況理解的最後部分是工兵與特戰部隊的溝通，這在宣戰前已經早已存在戰場了，工兵必須預判這些部隊的需求，藉由訓練及試圖建立專注的工兵資源建立兩者之慣常關係來支援作戰(可能以工兵特戰部隊模式支援小隊)



Future deployments may present challenges to engineers, such as this salvage and repair operation in the main seaport in Port-au-Prince, Haiti.

未來的部署將對工兵造成挑戰，像是圖中在海地的主要港口王子港進行救援與修復作業

Modes of Entry

The five modes of entry into a theater of operations are as follows:

■ From space. The use of directed-energy weapons can provide an entry of effects into a theater of operations. The more realistic space effect is the use of communication and surveillance satellites that support numerous mission command and geospatial platforms. Space superiority remains a priority in IE.

進入模式

進入戰場作戰的五種模式如下：

■ 從空間方面。導能武器的使用可以提供有效進入戰場作戰，通信及監視衛星的使用使得空間更為真實，這也提供多元的任務指揮及地理空間平台，空間的優勢仍在初始技能中仍屬優先。

■ From cyberspace. This was used successfully during the 2008 Russian incursion into Georgia to project effects into a theater of war. The engineer role in setting conditions for these effects could include providing facilities and “clean power” in the operational area.

■ 從網路空間方面。在 2008 年期間俄羅斯成功地入侵喬治亞州的網路空間，對於戰區產生影響，工兵在這方面扮演的角色包含在作戰區提供設施「乾淨的電力」。



Engineers assist seaborne entry into the theater of operations.

工兵協助海上運輸進入戰場

■ From land. The use of Kuwait as an intermediate staging base was a luxury that the United States enjoyed during Operation Iraqi Freedom. This may not be the case in the future.

■從陸地方面。在伊拉克自由作戰期間，美軍把科威特當成中繼基地，這是非常奢侈的一件事情，因為在未來的戰爭中也許不會有如此好的機會。

■*From the sea.* Engineers have not been fully challenged in this realm since the landings at Inchon during the Korean War or Da Nang during the Vietnam War. The most recent example of Army port establishment in a denied area was in Haiti after the 2010 earthquake, and the denial was not by an enemy force but by forces of nature. Key IE capabilities will be required to set the theater, and they will be a joint responsibility among many branches. Key IE engineer requirements in support of seaborne operations may include the following:

■從海上方面。工兵自從在韓戰期間的仁川港市登陸，或越戰期間的大楠登陸，已經好一陣子沒有如此完整的挑戰了。最近陸軍在阻絕區建立港口的例子就是 2010 年的海地大地震後，但這阻絕不是敵軍建立的，而是天然災害造成的。主要初始能力需要建立在戰場上，整合許多業管，工兵支援海上運輸作戰上之主要初始技能需求包含以下幾點：

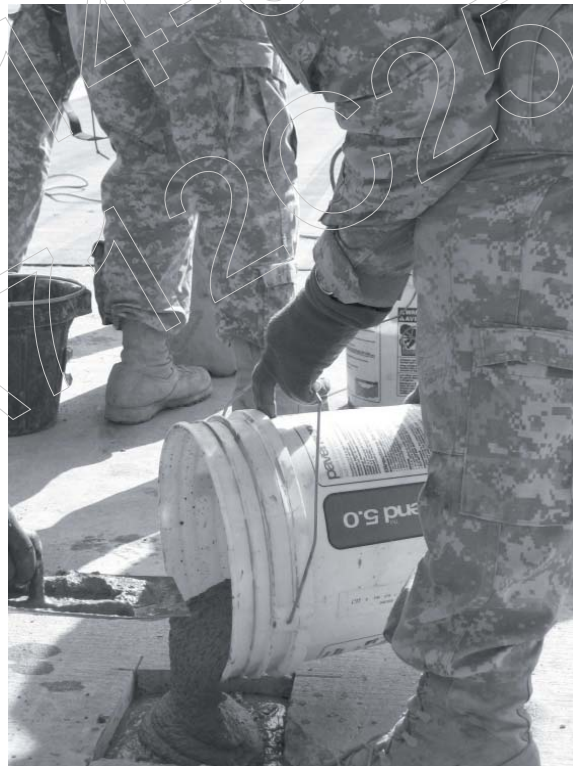
- 1.Diver support for port reconnaissance, hydrological survey, minor pier repair and construction, demolition (to include the destruction of sea- and shore-based mines), and salvage operations.
- 2.Engineer amphibious operations to augment divers.
- 3.Engineer support to the joint logistics over-the-shore (JLOTS) process. These requirements continue to evolve, and there are engineer forces embedded with certain transportation units tasked with the JLOTS mission. The implied tasks of this mission include the construction of marshaling yards that can be used by material-handling equipment for downloaded shipments, basic combat roads and trails to support the onward movement of forces, and the development of protective systems to support those operations and the mission command that controls them.
- 4.Pier and causeway construction and reconstruction in conjunction with transportation and U.S. Navy units.
- 5.Area clearance of specified areas, as in Bosnia and Afghanistan operations.
- 6.Route clearance within the area of operations.
- 7.Power generation to support the JLOTS and critical mission command systems.
- 8.Support to the interface of the offshore petroleum discharge and inland petroleum distribution systems and the provision of sea-based petroleum, oil, and lubricants to support follow-on operations, to include the construction of fuel bag farms and trailer transfer points.
- 9.Fire protection support to fixed- and rotary-wing aviation.
- 10.Contract capability, ranging from acquiring construction materials to providing services germane to an austere theater.
- 11.Environmental support planning that generates baseline surveys before, or

concurrent with, area occupation

12. Construction of ammunition holding areas.

13. Construction of Level 3 medical facilities.

1. 潛水員支援港口偵查、水文調查、小型碼頭維修與建造、爆破(包括水雷及灘岸地雷)及海難救助作戰。
2. 工兵兩棲作戰增援潛水員。
3. 工兵支援聯合灘岸後勤作業，這需要持續不斷地發展精進。工兵部隊編配於某些運輸單位執行聯合後勤灘岸作業任務，這任務的特定行動包含調車場建立，作為軍品處理裝備卸載船貨及基本戰鬥道路所使用，以支援兵力前進運動，防禦系統的發展來支援這些作業，受任務指揮之管制
4. 碼頭與堤道之建立與運輸，以及與海軍單位重新建立連結。
5. 特定區域之清除，像是波士尼亞與阿富汗作戰。
6. 作戰地區內之道路清除
7. 支援聯合後勤灘岸作業及主要任務指揮系統之所需電力
8. 支援沿岸石油卸載及內陸分配系統以及海上基地石油、汽料及潤滑油供應，以支援接下來的作戰，這也包含油田及貨車轉送點。
9. 定翼機與螺旋機飛航火力防護支援
10. 契約能力，涵蓋範圍從建材取得以至於嚴峻戰場勤務之提供
11. 區域占領之前或現階段，環境支援計畫所產生之基線測量。
12. 彈藥存放區之建構
13. 第三級醫療設施建造



A2020 engineers will be called on to perform a multitude of missions such as conducting rapid runway repair.

陸軍2020年的工兵將要具備多重任務，像是執行快速跑道修復

■ **From the air.** Although it is the quickest way into a theater, it is also limited by space available on U.S. Air Force aircraft. The mission of airfield seizure remains an enduring requirement. The role of the engineer is of particular importance as IE operations commence. Once airborne or airmobile forces reach the ground and dominate any opposing force, the work of the engineer begins in earnest. The IE capability in connection with the Air Force must include the ability to—

■ 從空中方面。儘管這是進入戰區最快的方法，但受限於空軍飛機可獲得之空域，空域取得任務仍然是一個長久的需求，工兵的角色就像是初始作戰一樣特別重要，當空降或空中機動部隊到達地面，壓倒敵軍部隊，工兵部隊的工作正式展開，連接空軍的初始能力必須包含：

1. Conduct rapid runway repair and improve existing runways (including the need for quick compaction capability, the construction or clearance of areas with diminished foreign-object damage hazards, or the use of AM-2 matting or other technical alternatives to expand the maximum-on-ground rating).
2. Work with Air Force engineers to establish functionality such as lighting, instrumentation, standoff, control towers, and navigational aids.
3. Establish fire protection for flight line operations. Establish fueling and rearming points for rotary- and fixed-wing aircraft and off-loading ground vehicles.
4. Conduct facility repair and construction to support air terminal operations (to include force protection for passengers in marshaling areas) and construct holding areas for material.
5. Increase fuel storage in the lodgment.
6. Assist the arrival and departure airfield control group with engineer material-handling equipment. After reception, staging, onward movement, and integration, the force performing a mission will be supported by engineers. The brigade combat team, with its organic BEB, will be tasked with the following requirements:
 1. 執行急迫跑道修復及改善現有跑道(包含迅速夯實能力、地區清理或建造以減少外物損傷危害，或使用 AM-2 或其他技術性的替代品來延伸地面最大等級)
 2. 與空軍工兵攜手建立像是照明、設備、遙距測、塔台控制及導航協助之功能。
 3. 為飛行線作業建立防火設備，及為旋轉與固定翼飛機及卸載車輛建立油料及改良武器補給點。
 4. 修護及建造設施來支援航空站作業(包含飛機調配整備地區之部隊防護)及建造軍品保存區。
 5. 增加營舍之油料儲存。
 6. 利用工兵軍品處理裝備來協助機場到站與離站控制組，經過接待、舉行、前進及整合，兵力執行任務將獲得工兵支援，旅戰鬥隊含旅工兵營將會賦予以下任務需求：

- Establishment of tactical assembly areas and associated force protection measures.
- Construction of combat roads and trails.
- Route clearance and offensive breaching.
- Lethal countermobility.
- Gap crossing.
- Construction of survivability positions.
- Construction of basic sanitary facilities.
- Establishment of force protection for mission command and air defense nodes.
- Construction of holding areas for enemy prisoners of war.
- Construction of temporary shelters for displaced civilians.
- Establishment of patrol bases.
- 建立戰術組合區並結合部隊防護措施。
- 建造戰鬥道路與小徑。
- 道路清除及攻擊破障。
- 致命反機動力
- 渡河作業
- 建造防禦陣地
- 建造基本衛生設施
- 建立部隊防護予以任務指揮及防空節點
- 建造敵俘收容區
- 建造難民收容所
- 建立巡邏基地

There will also be a multitude of missions to be performed by EAB engineers (directly assigned to BEB formations or under EAB engineer mission command), to include the critical mission of geospatial intelligence throughout the operation, maturation of the theater, and eventual phase changes that may lead to different objectives, such as contractor transition, improved quality of life, and the eventual building of partner capacity.

當然旅級以上工兵仍然有許多任務要執行(直接分配給旅工兵營或旅級以下工兵任務指揮)，主要任務包含整體作戰、作戰過程及最終階段改變之地理空間情報，這將導致不同目標，像是合約商轉換、生活品質改善及夥伴能力塑造。

Engineer School and Regiment Accomplishments

The EAB redesign has been the centerpiece of efforts to support IE. The BEB is at the point of need in brigade combat team formations and will be ready to accept EAB engineer capability based on the future mission. The EAB redesign community of practice will continue to contribute to the force design update process. Thus far, force design updates for the engineer

construction company and the geospatial planning cell are moving forward. Both of these capabilities, as delineated in this article, are critical condition setters for IE. In the coming year, the engineer combat company, the EAB battalion headquarters, and the theater engineer command will be reviewed and modified to support IE and engineer operations across all phases of an operation.

工兵學校與工兵團之成就

旅以上階層重新設計已經是支援初始技能的主要成果，旅工兵營在旅戰鬥隊形中擔任需求點，依據爾後任務預備來接受旅以上階層工兵能力，旅以上階層重新設計的實踐社區構想將持續貢獻於兵力設計更新程序，因此到目前為止，工兵建築連及地理工兵計畫單位的兵力設計更新仍持續進行中，本篇所描述的能力當中的兩個，是初始技能中主要的狀況假定者，在明年，工兵戰鬥連、旅級以上營部連以及戰場工兵指揮所將會檢視及更改作為支援初始技能及工兵跨越各階段作戰的行動。

The Engineer School and the Maneuver Support Center of Excellence continue to participate in Army lessons learned and infantry warfighter forums, where IE is a regular topic. The Engineer School and Regiment are helping craft IE doctrine, to include supporting the movement-and-maneuver concept at the U.S. Army Maneuver Center of Excellence and the joint concept for entry operations of the joint staff (in connection with the Army Capabilities Integration Center, U.S. Army Training and Doctrine Command).

工兵學校及戰鬥支援中心持續參與陸軍課程學習及步兵作戰會議，初始技能是很平常的課題，工兵學校及工兵群正在幫忙製作初始技能準則，包含支援戰鬥支援中心之運動及機動構想以及聯參入侵作戰的聯合構想（結合訓練計準則指揮部的陸軍能力整合中心）。

The Engineer School, in connection with the U.S. Army Corps of Engineers (USACE), held a secure video teleconference in September 2012 that hosted numerous Army service component commands and brigades and the three components of the Engineer Regiment. The topics of discussion were IE concepts, the level of training and readiness to perform IE operations, the needs of the Army service component commands in support of their geographical combatant commanders, and ways that the Engineer Regiment can help meet their IE challenges. The Engineer School forged a strategic relationship with the U.S. Army Transportation School and attended JLOTS events at Fort Story, Virginia, and Scott Air Force Base, Illinois, last year. JLOTS is an Army mission for the joint force, and we continue to identify gaps in doctrine and planning and to develop solutions to meet the most intractable IE challenges along the doctrine, organization, training, materiel, leadership and education, personnel, and facilities spectrum.

工兵學校與美國陸軍工程兵團在2012年12月辦了一個安全視訊會議，邀請了許多陸軍勤務單位指揮部、旅級及工兵群的三個部門，討論的主題是初始技

能的構想，針對執行初始作戰之訓練層級及整備，陸軍勤務單位指揮部需要支援他們的地理戰鬥指揮官及工兵群可以幫助他們迎接初始技能挑戰的方法，工兵學校去年與陸軍運輸學校磨練戰略關係並在維基尼亞史多利堡及伊利諾州史考特空軍基地參加聯合後勤灘岸作業議題，聯合後勤灘岸作業任務是陸軍聯合兵種的任務，我們持續發現準則與計畫的疏漏及在準則、組織、訓練、軍品、領導、教育、人事及設施範圍中，針對棘手的初始技能挑戰發展出解決之道。

The Engineer School commandant and key staff attended the Joint Operational Access Exercise at Fort Polk, Louisiana, in October 2012. Key lessons from that exercise directly affect modifications of the EAB force structure that will support light and heavy airfield repair packages and the training that is required to sustain them.

工兵學校校長及主要幕僚在2012年10月參加路易斯安那州波克堡的聯合作戰演習，演習的主要課程對於旅級以上結構調整有直接影響的，就是支援輕型及重型機場搶修包，需要訓練來維持這些作業能力。

The Solution and You

None of this planning can be accomplished in a vacuum. The connectivity within the Engineer Regiment will inform these processes. For engineers from the Regular Army, Army National Guard, U.S. Army Reserve, and USACE who can influence and provide a voice, the following steps are suggested:

答案與你

這項計畫不可能憑空完成，工兵團間的連結將報告這些流程，對工兵言，從正規陸軍、國民兵、後備部隊及美國陸軍工程兵團都可以影響及發聲，提供以下建議：

- Continue to participate in the EAB redesign community of practice. Those who have not already joined are asked to contact the author at adam.s.roth2.mil@mail.mil to be included.
- The Engineer School commandant seeks a joint engineer exercise that will test IE concepts in supporting the maneuver force. This could be part of an existing exercise or a stand-alone exercise. The USACE joint rapid airfield construction (now engineer rapid airfield construction), which was last fully tested at Exercise Talisman Saber in Australia in 2007, was also a staple of these types of exercise for many years. If there is a desire in the field to participate in reinvigorate, or sponsor such an exercise, please contact the author to share your thoughts.
- Many of the junior leaders who developed the tactics, techniques, and procedures of IE during the late 1990s are now senior leaders in the Engineer Regiment. Have those tactics, techniques, and procedures been codified into institutional documents? Are there gaps in training that the Engineer School and Regiment can help fill? Are there products and smart cards that can assist Sappers at the hammerhead? Are there thoughts

about developing gunnery tables or drill manuals that focus on the engineer IE tasks required to get troops on the ground, on the basics of soil mechanics to achieve proper compaction at an austere forward landing site, or on standardizing airfield repair packages? Engineer leaders are encouraged to contact the author as the Regiment works to answer these questions.

- 持續參與旅級以上階層重新設計的執行共同體，還未參與的人員請連繫作者。
- 工兵學校校長想以一種聯合工兵演習，測驗有關支援機動部隊的初始技能概念，這可能是既有測驗的一部分或者是獨立的測驗。陸軍工程兵團聯合快速機場建造(現在稱為工兵快速機場建造)，最後一次完整的訓練是在 2007 年澳洲所辦的 **Talisman Saber** 演習，這是主要的演習項目之一，如果有興趣參與這項復甦行動或者贊助者，請聯絡作者分享你的想法。
- 許多在 1990 年代後期參與戰術、技術及初始技能發展過程的年輕領導幹部，現在都是工兵團的資深幹部，這些戰術、技巧及程序已經編纂成組織的文件了嗎？工兵學校與工兵團可協助填補這些訓練的不足嗎？有任何產品及智慧卡片可以幫助工兵通過測驗嗎？有任何射擊表與訓練手冊的發展是著重在工兵地面部隊的初始任務需求嗎？或在嚴峻的前進降落地點上，以土壤力學基本原理達到適當的夯實；或標準的機場搶修包？鼓勵工兵團的幹部們在致力於這些問題時，可與作者聯繫。

Conclusion

This article delineates what must be done, but does not determine who will do it. What capabilities will the Regular Army require of the Reserve Component? Which service will be responsible for performing what functions? Will the reduction in naval mobile construction battalion capability create new mission sets for the other services? Will the need for simultaneous action in A2020 for multiple landing sites exceed the capabilities of the U.S. Marine Corps air-ground task force? Will the other Services have to augment the Marines in the function that has been their sole domain since the end of World War II? Lastly, will the Engineer Regiment have the depth of skills required to relearn tasks that have long been neglected and will there be resourcing available to make this a reality? As always, the author welcomes vociferous debate.

結論

本篇描述什麼該做，但是沒決定誰要去做，正規陸軍要求後備單位具備哪些能力？哪個部隊負責執行何種功能？是否海軍機動建築營能力的緊縮會創造另一個單位全新的任務？陸軍 2020 年複合式登陸地點超越美軍海軍陸戰隊地空任務部隊之能力？自從二次世界大戰結束後，有其他的勤務單位必須要來加強海軍陸戰隊在他們獨立領域的功能嗎？最後，工兵團需不需要重新學習那些已經長久被忽略的任務技巧？是否有足夠資源可付諸實行？正如往常一樣，作者歡迎大家踴躍討論。

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羅斯上校為美國工兵學校副助理校長(陸軍後備)，在美戰院畢業前，他是844 工兵營營長，部署於伊拉克，為空中任務部隊之一部，他現在是美指參大學的研究生，同時已擁有波士頓大學技術工程碩士學位。