Expanding the Lodgment to Extend Operational Reach

A Monograph

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With a need to project power globally, US Army planners must prepare for expeditionary operations, which history shows often take place in austere environments. Operational planners must ensure that lodgment exists in the theater of operations from which commanders can extend their operational reach. Austere conditions often require planners to find various means to establish logistics bases because the existing infrastructure does not support operations or friendly forces do not control that infrastructure.

This monograph examined several cases where logistics bases played a role in American military history. Each case study provides an analysis of factors affecting a base's usefulness: operational reach, ability to prevent culmination, and the arrangement of operations. Case studies during World War II focus on three seaports used by the Allies—the port at Cherbourg, the artificial Mulberry harbors, and the port at Antwerp. Each port offered different capabilities and challenges for the Allies as they sought to expand their initial lodgment. The final case examines airports as logistics bases during Operation Just Cause. The findings illustrate the similarities and differences of these types of logistics bases, and provide future planning considerations for establishing a seaport or airport as a logistics base.

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Abstract

Expanding the Lodgment to Extend Operational Reach, by MAJ Jefferson D. Burges, 43 pages.

With a need to project power globally, US Army planners must prepare for expeditionary operations. History shows that such operations often take place in austere environments. Operational planners must therefore ensure that lodgment exists in the theater of operations from which commanders can extend their operational reach as required to accomplish the mission. Austere conditions often require planners to find various means to establish logistics bases because the existing infrastructure either does not support operations or friendly forces do not control that infrastructure.

This monograph examined several cases in which logistics bases played a key role in twentieth century American military history. Each case study provides an analysis of several factors affecting a base's usefulness to the commander: operational reach, capability to prevent culmination, and the commanders' arrangement of operations. Case studies of the US Army during World War II focus on the usefulness of three seaports in Western Europe as logistics bases for the Allies—the port at Cherbourg, the artificial Mulberry harbors, and the port at Antwerp. Each of these ports offered different capabilities and challenges for the Allies as they sought to expand their initial lodgment after the Cross-Channel Attack. The final case examines the usage of airports as logistics bases in Panama during Operation Just Cause. The findings from this analysis illustrate the similarities and differences of these different types of logistics bases, and provide future planning considerations for establishing either a seaport or airport as a logistics base to extend the operational reach in a new theater of operations.

Contents

Acronyms

ADP	Army Doctrine Publication
ADRP	Army Doctrine Reference Publication
COSSAC	Chief of Staff to the Supreme Allied Commander
FM	Field Manual
JP	Joint Publication
PDF	Panama Defense Forces
SEAL	Sea, Air, Land
SHAEF	Supreme Headquarters Allied Expeditionary Force
SOUTHCOM	Southern Command
TM	Technical Manual
TRADOC	Training and Doctrine Command

Introduction

You can almost always force an invasion, but you can't always make it stick.

—General Omar Bradley on the eve of D-Day

On October 22, 2013, General Raymond Odierno told members of the Association of the United States Army that the US Army must establish an expeditionary capability after its completion of operations in Afghanistan. Furthermore, Army Doctrine Publication 1, *The Army* (ADP 1) incorporates expeditionary requirements as part of the mission of the Army, and historically, these often take place in austere conditions. Therefore, operational planners must prepare for future deployments in which the Army conducts expeditionary operations in an environment initially lacking the infrastructure necessary to support sustained combat operations.[1]

Historical expeditionary operations often involved expanding the lodgment in austere conditions—for example, the Allies on the Western Front of the European Theater of Operations relied heavily on ports to extend operational reach from the landings at Normandy until Germany's surrender. Similarly, modern US military operations require significant planning and preparation to sustain operational reach, as seen in cases such as the seizure of an airfield during Operation Just Cause in Panama. US military forces that deploy overseas to conduct future operations will require supplies to extend their operational reach until they reach their objective,

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[1] Dan Parsons, "Odierno Calls For Expeditionary Army After Afghanistan." *National Defense Magazine*, October 22, 2013, accessed September 4, 2014, http://www.nationaldefensemagazine.org/blog/Lists/Posts/Post.aspx?List=7c996cd7%2Dcbb4%2D4018%2Dbaf8%2D8825eada7aa2&ID=1310; Army Doctrine Publication (ADP) 1, *The Army* (Washington DC: Government Printing Office, 2012), 1-8; Roland G. Ruppenthal, *Logistical Support of the Armies in Two Volumes: Volume I: May 1941-September 1944* (Washington, DC: Center for Military History, 1995), 286.

as did their historical counterparts. Planners must consider operational reach by analyzing existing infrastructure and finding ways to expand it as required, both to enable initial disembarkation of personnel and equipment and to support follow-on operations after establishing the lodgment. Operational reach appears in modern US military doctrine, in both the elements of operational design and the elements of operational art, serving as a key function to allow the commander to maintain the desired tempo and prevent culmination.[2]

Background

The commander of Training and Doctrine Command (TRADOC) wrote in 2014 in TRADOC Pamphlet 525-3-1, *The US Army Operating Concept: Winning in a Complex World* that the Army should expect to conduct expeditionary deployments in future conflicts. Furthermore, the document indicated that the US military must prepare to respond to situations across the globe. In such situations, the US Army will most likely conduct operations in a theater where it has no existing military bases and limited—or contested—access. To extend operational reach, operational planners must ensure the availability of adequate infrastructure in the new theater. If inadequate or damaged infrastructure exists or the enemy makes a deliberate effort to deny access to an unacceptable degree, operational planners must identify a means to extend operational reach. This will include the capability to achieve an initial lodgment and then expand

[2] For a description of the value of ports in World War II see Ruppenthal, *Logistical Support of the Armies: Volume I*; for an examination of Operation Just Cause see Lawrence A. Yates, *The U.S. Military Intervention in Panama: Origins, Planning, and Crisis Management, June 1987–December 1989* (Washington DC: Center of Military History, 2008); for the definitions of elements of operational design see Joint Publication (JP) 5-0, *Joint Operation Planning* (Washington DC: Government Printing Office, 2011), III-18—III-38; for the definition of elements of operational art see Army Doctrine Reference Publication (ADRP) 3-0, *Unified Land Operations* (Washington DC: Government Printing Office, 2012), 4-2—4-9; TRADOC Pamphlet 525-3-1, *The US Army Operating Concept* (Washington DC: Government Printing Office, 2014), iii, 15.

that lodgment to allow additional forces and supplies into the theater. The operational planner must provide the commander an assessment of the means available and recommend options to expand these means based on the situation. The US Army has not faced a situation that required rapid establishment of infrastructure to support a new theater of operations in over ten years. Over such a long period, doctrinal, organizational, training, and equipping limitations can emerge.

As part of the effort to resolve the requirements of extending operational reach in a new operational environment, the Engineer Branch modified the language of its capstone doctrine, Field Manual 3-34, *Engineer Operations (*FM 3-34) released in April 2014. Engineer leaders modified the language describing engineer support by altering the previous phrase, "enable logistics" to the new phrase, "enable force projection and logistics." This modification highlights the importance of the infrastructure required to support the sustainment of forces in a theater of operations. Engineers cannot accomplish this task alone; it will require integration across multiple warfighting functions. Planners must synchronize the requirements of maneuver forces, the capabilities of sustainment elements to provide that support, and the capacity of the available infrastructure. If the accessible infrastructure cannot initially support the operation, operational planners must determine how to increase the capability of that infrastructure in the required time.[3]

With the need to project power globally, future operational planners designing campaigns involving deployment to a new theater of operations will face the problem of creating or augmenting infrastructure to extend operational reach—particularly in the case of creating and expanding lodgments. This exposes a potential serious shortcoming in Army planning considerations, physical capability, and doctrinal integration. With a recent lack of experience in training and execution of such operations, US Army planners must relearn how to assess the

[3] Field Manual (FM) 3-34, *Engineer Operations* (Washington, DC: Government Printing Office, 2014), v.

required infrastructure of the lodgment in a theater of operations and enhance it as required. History provides planners multiple examples of cases in which the Army had to meet these demands.

Methodology

Given the requirement for an expeditionary force described by senior leaders and doctrine, US military personnel must evaluate the ability of their branch or service to perform the specific elements of operational design that allow these forces to conduct operations successfully. For operational planners to conduct operational art and arrange tactical actions in time, space, and purpose those planners must place an emphasis on how expeditionary forces with their equipment will arrive into the theater of operations. Basing in particular requires planners' attention—specifically logistics bases. A logistics base must possess the capacity to facilitate the movement of sufficient personnel and equipment into the theater of operations to prevent any disruption to the commander's tempo, thereby extending the commander's operational reach. Any disruption of logistics support could reduce the commander's operational reach, resulting in the risk of early culmination and possibly ceding the initiative to the enemy.[4]

The term *basing* is a component of operational reach—one of joint doctrine's elements of operational design—but it is a distinct element of operational art in Army doctrine. As this research will focus on the importance of the infrastructure at the lodgment, analysis must examine basing as a distinct element of operational art while acknowledging its linkage to operational reach. The explanation of basing in Army Doctrine Reference Publication 3-0, *Unified Land Operations* (ADRP 3-0) includes numerous components including logistics bases. ADRP 3-0 defines bases as "a locality from which operations are projected or supported." Logistics bases

[4] ADRP 3-0, 4-1, 4-6.

specifically provide the support for the operations. The logistics base may be near a seaport or an airfield. All logistics bases can support daily transit, loading, and off-loading of a limited number of sea or aircraft and some have limitations in the size or type of craft they can support. Operational planners must therefore evaluate various options to bring personnel and equipment into the theater of operations. If the available infrastructure does not facilitate the required throughput, commanders must commit time and resources to improve the existing infrastructure.[5]

A planner must know the necessary operational reach in order to determine whether a particular logistics base can support the operation. ADRP 3-0 describes operational reach as a "tether" which can limit a commander's time and distance of operations. Joint Publication 5-0, *Joint Operation Planning* (JP 5-0) links basing directly to operational reach as a key limiting factor in the quantity of combat power that the commander can employ in a theater. The logistics base must possess the capacity to process adequate sustainment support for the commander to conduct operations in a given theater of war or area of operations. To plan for the required capacity, a planner can analyze previous operations to identify the infrastructure historically required at a given logistics base to support the requisite operational reach, using that data to estimate requirements in the future operational environment. Cases in which operational reach suffered because of inadequate sustainment capacity at the logistics base can provide valuable insight, just as cases in which the infrastructure did support logistics requirements, since both highlight key considerations that planners might otherwise overlook.[6]

Should the logistics base fail to support the operational reach required for the commander to conduct operations, the force may face culmination. JP 5-0 defines the culmination point as "that point in time and/or space at which the operation can no longer maintain momentum." This

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[5] JP 5-0, III-34; ADRP 3-0, 4-6.

[6] ADRP 3-0, 4-5; JP 5-0, III-33–III-34.

point represents the point in an operation when or where the commander cedes the initiative to the enemy. In an expeditionary operation, culmination could prove disastrous. Therefore, if a force finds itself unable to continue its required form of operations due to a lack of sustainment support into theater, planners can analyze the logistics base and learn from the limitations that prevented it from meeting its requirements for the operation.[7]

Knowing the requirements for the logistics base to support adequate operational reach to prevent culmination, a commander must then apply the element of *arranging operations* to meet that need. JP 5-0 provides several components of this element, including simultaneity and tempo. Simultaneity involves conducting multiple operations at once. Tempo involves many considerations such as the effect of branches, sequels, and operational pauses on the timing of operations. While branches and sequels provide the commander options to maintain momentum relative to the enemy, an operational pause can cede that momentum to the enemy, at least temporarily. The commander must arrange the available forces in the optimal manner to allow use of all available means to preserve the initiative relative to the enemy. A proper logistics base provides one means to maintain that capability. Each belligerent in a conflict will need to resupply its forces in the field. When the US military conducts expeditionary operations, it must ensure that its forces can resupply at the speed required to maintain the desired tempo, while facing an enemy that often enjoys advantages including proximity to its industrial base, local support, and no requirement for resupply by any means other than land.[8]

Historical case studies examining the challenges, decisions, and capabilities required to create adequate infrastructure in Western Europe during World War II and in Panama during Operation Just Cause illustrate the requirements of conducting such operations in the future.

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[7] ADRP 3-0, 4-8.

[8] JP 5-0, III-35—III-38.

Three ports in Western Europe proved particularly significant to support logistics—Cherbourg, Antwerp, and the "Mulberries" (artificial ports designed to provide limited throughput pending Allied logistics operations commencing at Cherbourg and Antwerp). Initially Cherbourg served as a critical objective for Operation Overlord. Planners realized that the Mulberries could provide only a limited and temporary means to project sustainment support into the theater, making the rapid opening of the Cherbourg port a particularly important objective. Upon extending operations east from Normandy, the Allies intended to seize Antwerp to establish a logistics base closer to the advancing Allied forces. [9]

Analysis of the Western Europe cases illustrates how the need for seaport infrastructure influenced planning decisions for the locations of objectives during Operation Overlord and follow-on operations. For each port in Western Europe, World War II planners estimated the time required to repair existing infrastructure (or establish it in the case of the Mulberries) and the expected throughput of supplies once operational. Planners today will conduct similar analysis for

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[9] The Cherbourg port was critical to the planning of Operation Overlord. For more information on Cherbourg during and after Operation Overlord see: Alfred M. Beck, et al., *United States Army in World War II: The Technical Services: The Corps of Engineers: The War Against Germany* (Washington DC: Center for Military History, 1985); Dwight David Eisenhower, *The Papers of Dwight David Eisenhower* (Baltimore: Johns Hopkins University Press, 1970); Gordon A. Harrison, *United States Army in World War II: The European Theater of Operations: Cross-Channel Attack* (Washington DC: Center for Military History, 1951); R.P.W. Havers, *Battle for Cherbourg, Battle Zone Normandy*, ed. Simon Trew (Phoenix Mill, England: Sutton Publishing, 2004); Ruppenthal, *Logistical Support of the Armies: Volume I*. For more on the seizure of the port at Antwerp see: Dwight David Eisenhower, *Crusade in Europe* (Garden City, NY: Doubleday & Company, Inc., 1948); Nigel Hamilton, *Monty: The Battles of Field Marshall Bernard Montgomery* (New York: Random House, 1981); Roland G. Ruppenthal, *Logistical Support of the Armies in Two Volumes: Volume II: September 1944-May 1945* (Washington, DC: Center for Military History, 1995). Cornelius Ryan, *A Bridge Too Far* (New York: Simon and Schuster, 1974). For more on the Mulberries see: Beck, et al., *The Corps of Engineers: The War Against Germany*; Eisenhower, *The Papers of Dwight David Eisenhower;* Guy Hartcup, *Code Name Mulberry: The Planning, Building and Operations of the Normandy Harbours* (New York: Hippocrene Books, 1977); Ruppenthal, *Logistical Support of the Armies: Volume I*; Alfred Stanford, *Force Mulberry: The Planning and Installation of the Artificial Harbor off U.S. Normandy Beaches in World War II* (New York: William Morrow and Company, 1951).

future operations. Studying past examples will provide planners insight regarding the various means by which they can establish these logistics bases. Furthermore, examination of the supply requirements in those cases based on the anticipated force structure gives planners an example of how to determine the time required to establish a logistics base and the effect this will have on tempo. These cases also provide an example of the final throughput of supplies into a theater necessary to provide forces the operational reach to achieve their objectives. Modern day planners must make similar assessments or risk early culmination because of logistics shortfalls, ceding the initiative to the enemy.

The Torrijos-Tocumen Airport—the infrastructure most important during establishment of the lodgment during Operation Just Cause—serves as the focus of the final case study. The analysis again assesses the planners' initial views regarding the importance of this lodgment, compared to its actual throughput capacity once secured. This analysis provides an example of a different type of logistics base for an operational planner than the seaports often used in World War II. Operation Just Cause involved a different force structure than the Allied presence in Western Europe as well. Planners who will rely on an airfield rather than a seaport to support forced entry operations must understand the unique capabilities and limitations of an airfield when estimating the throughput of personnel and equipment. The Torrijos-Tocumen Airport provides an example of an airfield that provided the required operational reach as planned.[10]

[10] For accounts of Operation Just Cause see: Clarence E. Briggs, *Operation Just Cause: Panama 1989: A Soldier's Eyewitness Account* (Harrisburg, PA: Stackpole Books, 1990); Thomas Donnelly, Margaret Roth, and Caleb Baker, *Operation Just Cause: The Storming of Panama* (New York: Lexington Books, 1991); Edward M. Flanagan, *Battle for Panama: Inside Operation Just Cause* (New York: Brassy's, 1993); Malcom McConnell, *Just Cause: The Real Story of America's High-Tech Invasion of Panama* (New York: St. Martin's Press, 1991); Yates, *The U.S. Military Intervention in Panama*.

In both World War II and Operation Just Cause, the US Army had to project combat power onto enemy-controlled terrain. Planners prepared to extend operational reach by sending additional forces and supplies into the theater. In each situation, the success or failure to secure and repair the required infrastructure affected the commander's ability to maintain the desired tempo of the operation and prevent early culmination. Comparative analysis of the findings of each case study demonstrates the validity of the thesis, and leads to identification of several key considerations that operational planners and commanders should address when planning and executing future operations that involve establishing and expanding a lodgment. The findings include a review of doctrinal, organizational, and equipping capabilities necessary for expanding the lodgment in a future operational environment.

Western Europe in World War II

Background

Planners in the US War Department initially sought to develop a feasible design for an invasion of the European continent from England to take place in the summer of 1942. General Dwight Eisenhower wrote a memorandum to General George Marshall on March 25, 1942 advocating for the first attack against Germany to occur in Western Europe in the form of a Cross-Channel attack into France. Planners understood from the outset that the Cross-Channel invasion would require the rapid seizure of a nearby, functional, and high capacity port to keep the heavily mechanized and motorized US Army supplied. The Allies needed a suitable seaport logistics base from which they could expand their initial beachhead and project additional combat power onto continental Europe. The July 1943 plan for the Cross-Channel invasion, which accounted for an initial invasion by three divisions, estimated a requirement of 10,000 tons of supplies per day starting three days after the invasion with an increase to 18,000 tons per day by

the eighteenth day. Initial plans identified the ports of Cherbourg and Le Havre as those that offered the best opportunities.[11]

United States doctrine during World War II did not include the modern joint elements of operational design or the Army's elements of operational art. The capstone doctrine, FM 100-5: *Field Service Regulations, Operations,* dealt mostly with tactical engagements and leadership. The 1941 version of FM 100-5 addressed the need to establish a bridgehead when conducting river crossings, and by 1944, the FM included a section on amphibious operations that described the need to establish a beachhead. The chapter further outlined the need to establish a port quickly to provide supplies for the combat units. FM 100-15: *Field Service Regulations, Large Units,* also addressed various operational considerations. While the US Army's WWII doctrine did not use today's lexicon to describe why units needed to expand initial lodgments, today's planners understand that they enabled World War II leaders to arrange operations to maximize operational reach and avoid early culmination—modern terms to describe longstanding concepts.[12]

Allied senior leaders appointed Lieutenant General F. E. Morgan as Chief of Staff to the Supreme Allied Commander (designate) (COSSAC) on March 13, 1943 to lead the planning for the Cross-Channel attack. With the requirement of an adequate port identified as a key consideration, COSSAC planners explored options for landing sites. Pas de Calais had several advantages. Its location at the narrowest point of the English Channel, the proximity of the landing sites to Germany, and the ability of land-based fighters to provide air cover from bases in

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[11] Harrison, *Cross-Channel Attack*, 21; "Eisenhower to Marshall," March 25, 1942, *The Papers of Dwight David Eisenhower*, Volume 1, Part I, Chapter 2: "Bolero", 205-7; Ruppenthal, *Logistical Support of the Armies: Volume I*, 270.

[12] Field Manual (FM) 100-5, *Field Service Regulations: Operations, 1941* (Washington, DC: Government Printing Office, 1941), 194; Field Manual (FM) 100-5, *Field Service Regulations: Operations, 1944* (Washington, DC: Government Printing Office, 1944), 287-9; Field Manual (FM) 100-15, *Field Service Regulations: Larger Units, 1942* (Washington, DC: Government Printing Office, 1942), 31.

England provided distinct benefits as a crossing site. However, there existed no major ports in the vicinity of those beaches. The lack of existing infrastructure to create a logistics base would delay the Allied tempo of follow-on operations as support personnel worked to overcome this challenge. Further to the west, the Brittany Peninsula offered existing seaports for use. Its greatest disadvantage lay in the longer distance from Germany. This greater distance would require an even longer operational reach as the Allies advanced towards Germany. The port at Cherbourg on the Cotentin Peninsula lacked the equipment for large scale cargo unloading, but it did offer an established port within the reach of Allied air cover from England. The peninsula itself protected the Calvados beaches in Normandy and provided some shelter from inclement weather, and the beaches' width would support offload of a great deal of equipment with which to establish an initial lodgment. Finally, a road network existed behind the beaches that would assist mechanized and motorized Allied forces as they expanded their initial lodgment while offering tactical opportunities to the commanders on the ground. While not perfect, the planners ultimately found that the port at Cherbourg offered the best option of existing ports to serve as the Allied logistics base.[13]

Given the objective of Cherbourg, the Allies had to determine the force required to seize the objective and the means to transport the necessary personnel and equipment across the English Channel. Eisenhower wrote to the Combined Chiefs of Staff on January 23, 1944 to inform them that he required at least five divisions for the initial assault to ensure an adequate beachhead and provide sufficient forces to seize a port on the Cotentin Peninsula. In another letter to Marshall, Eisenhower identified securing a permanent harbor as his first priority after seizing the beaches on D-Day and expanding the lodgment. To meet these operational objectives and

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[13] Russell F. Weigley, *Eisenhower's Lieutenants: The Campaigns of France and Germany, 1944-45* (Bloomington, IN: Indiana University Press, 1981), 53, 55, 58.

transport five divisions across the English Channel, Eisenhower required 263 amphibious landing craft, double the original projections. Additionally, mechanized and motorized forces required more shipping space to transport the equipment of a modern army. Eisenhower required these landing craft to enable him to arrange his operations so that he could extend Allied operational reach in France and establish a combined arms defense in depth before the Germans could react and attempt to regain the initiative.[14]

In addition to the transportation of personnel and equipment across the English Channel, the Allies also faced a shortage of shipping assets to transport personnel and equipment from the United States to the various theaters of the war. The United States lacked adequate shipping to support both Lend-Lease and its own mobilization requirements before its entry into World War II, and a shortage of shipping assets remained a problem for the Americans throughout the war. During three months in early 1942 off the eastern coast of the United States, the Nazi Operation Drumbeat destroyed 216 vessels—sinking 1.25 million tons of Allied shipping capacity in a single operation. These ships would have provided crucial supplies from the United States to the European Theater, and American industry lacked the ability to build additional transport ships at the rate required for global mobilization, much less to replace lost shipping capacity.[15]

By the end of 1942, American shipping operations had improved, but the Battle of the Atlantic was far from over. Once the Allies began to gain the initiative in trans-Atlantic shipping, Eisenhower still had to contend with strategic priorities. The leaders of the United Kingdom,

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[14] Havers, *Battle for Cherbourg,* 11; "Eisenhower to Combined Chiefs of Staff and British Chiefs of Staff," January 23, 1944, *The Papers of Dwight David Eisenhower,* Volume 3, Part VII, Chapter 16: "Every obstacle overcome, . . . every risk run", 1673-5; "Eisenhower to Marshall," February 19, 1944, *The Papers of Dwight David Eisenhower,* Volume 3, Part VII, Chapter 17: "Anvil and the Transportation Plan", 1737; David M. Kennedy, *Freedom From Fear* (New York: Oxford University Press, 1999), 699.

[15] Charles B. MacDonald, *The Mighty Endeavor* (New York: Oxford University Press, 1969), 48, 56; Kennedy, *Freedom From Fear,* 570.

United States, and Soviet Union agreed upon future allocation of resources at the Casablanca Conference in January 1943. The agreement included a plan of thirty percent allocation to the Pacific Theater, a promise to continue Lend-Lease to the Soviet Union, and a continuation of the Mediterranean campaign in Sicily following operations in Northern Africa. In a February 7, 1944 diary entry Eisenhower expressed his concern over the lack of landing craft dedicated to the European Theater, caused both by an overall shortage of landing craft and the allocation of a sizable percentage to the Pacific Theater. Making matters worse, in addition to Operation Overlord in Normandy, Marshall pushed for Operation Anvil—a supporting operation involving an invasion of France from the south by a combined army group. The shortage of landing craft remained one of the most significant Allied limitations in the planning for Operation Overlord. This made it difficult for Allied planners to prioritize support to ensure both successful amphibious landings and establishment of logistics bases.[16]

Once Allied planners determined a means to transport personnel and equipment across the English Channel, they had to contend with the fact that the enemy controlled all of the ports in Western Europe. This had a significant impact on the operational plan. Engineers and logisticians could not conduct a proper reconnaissance of the ports and therefore had to make assumptions to create their planning factors. The lack of activity at the ports during German occupation allowed the harbors to fill in with silt, which would create delays in restoring their operational capacity. This degradation of existing ports would increase the time required to establish a sufficient logistics base, slowing down the Allied tempo and possibly limiting operational reach. Lacking a thorough reconnaissance of Cherbourg prior to its capture, Allied engineer planners had to

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[16] "Memorandum For Diary," February 7, 1944, *The Papers of Dwight David Eisenhower*, Volume 3, Part VII, Chapter 17: "Anvil and the Transportation Plan", 1711-2; Kennedy, *Freedom From Fear*, 585-7, 699-700.

develop a general plan to repair a port without knowing the extent of its degradation. In 1943, engineers began the necessary calculations to repair the port. However due to security reasons, engineer planners did not receive the full details of the plan until the late summer of 1943.[17]

The engineer units who would repair the Cherbourg port benefited from both existing doctrine and specialized units and equipment, including an Engineer Port Repair Ship and an Engineer Port Construction and Repair Group. FM 5-5, *Engineer Field Manual: Engineers Troops* dated 1943 described the organization, equipment, and mission of these units. The Engineer Port Repair Ship provided a heavy crane and a machine shop, critical equipment for the removal of obstacles from the berth areas and for clearly marking the channels. The Engineer Port Construction and Repair Group consisted of highly skilled individuals who could maintain the standards of civilian port construction workers. For example, the engineer section in the headquarters platoon included officers trained in structural engineering and mechanical engineering, and enlisted personnel skilled at conducting surveys and designing operations. The construction platoon contained a diver's section, a shop section, and two dock sections. The Field Manual described the officers in this platoon as technical engineer experts, and the enlisted personnel as skilled construction workers. As of 1943, both doctrine and organizations existed that would enable the Engineer Branch to conduct port repair and establish a sufficient logistics base by expanding and improving existing port facilities.[18]

Despite this detailed planning and preparation for the use of established ports such as the one at Cherbourg as logistics bases, the possibility existed that the invasion forces might experience delays capturing or reestablishing the functionality of the ports. Planners anticipated

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[17] Beck, et al., *The Corps of Engineers: The War Against Germany*, 281-2.

[18] Field Manual 5-5, *Engineer Field Manual: Engineers Troops* (Washington, DC: Government Printing Office, 1943), 6, 170-4.

this risk and looked for an alternative means to move personnel and equipment from ship to shore. Naval planners played a key role in determining the best means to allow the army to expand its initial foothold in Northern France should existing ports prove insufficient. Demonstrating bold and creative thinking, naval planners provided an innovative alternative to the use of established ports—artificial harbors that the Allies would create for the assault force under the code name of Mulberry. The Mulberry harbors consisted of various components to provide shelter to cargo ships approaching the Normandy beaches from the harsh tides and winds of the English Channel and facilities to allow the offloading of personnel and equipment from ships to shore. To provide outer protection, the Allies built concrete rectangular vessels called Phoenixes and steel tanks called Bombardons, which they sunk three miles off shore after traversing the English Channel. For the purpose of the actual unloading operations, the Allies created a floating pier head called a Whale to establish a roadway from the English Channel onto the beach. In addition to these artificial floating piers, the Allies transported unserviceable ships closer to the beaches and scuttled them to provide shelter for landing craft at the beach itself, which they called Gooseberries. This arrangement of operations and use of initiative had the potential to extend the Allied operational reach and, if necessary, compensate to some degree for the limitations of existing port facilities.[19]

The Mulberry ports provided an answer to the problem of quickly establishing a port that would support the assault force. However, the greatest problem lay in the sea itself in the English Channel. The area around the proposed landings consisted of deep tidal currents. The waters around the Cotentin Peninsula had currents of three to four knots, which would not provide the ideal conditions for a floating harbor. This plan called for the creation of sections that would

[19] Stanford, *Force Mulberry*, 33; Hartcup, *Code Name Mulberry*, 15.

create two harbors, one to support the American and one to supply the Commonwealth Divisions. On D-Day, naval vessels would tow these sections across the English Channel with the expectation of assembling them within fourteen days of the initial amphibious invasion. This immense feat of construction under severe sea conditions would provide the logistical lifeline to the Allied forces on the beach prior to the successful capture and rehabilitation of permanent ports such as Cherbourg as logistics bases.[20]

Following the successful establishment of a port on the Cotentin Peninsula, Allied planners had to consider subsequent locations for additional ports. This plan for branches and sequels as planners arranged successive operations would help the Allies maintain the initiative. Without additional ports along the Northern European coast to use as logistics bases, the extended lines of communication would hinder the operational reach of Allied commanders. The plans for Overlord called for General George Patton's Third Army to follow General Omar Bradley's First Army into France and maneuver west to seize the Brittany Peninsula. His specific objective was the capture of the port at Brest to establish another logistics base to facilitate the movement of additional personnel and supplies into France.[21]

Eisenhower's forces made final preparations for their role on D-Day. The operational commanders understood that success meant more than securing a foothold on the European continent. For Allied forces to defeat the German Army and force Hitler's unconditional surrender, they had to expand their lodgment rapidly. The commencement of the amphibious assault initiated a race between the Allies and Germans. The Allied race to maintain the fastest tempo required the means to build up their forces quickly. To do this they needed a logistics base

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[20] Stanford, *Force Mulberry*, 35-36.

[21] Omar N. Bradley and Clay Blair, *A General's Life* (New York: Simon and Schuster, 1983), 233.

to increase their mass. Furthermore, without the required mass and logistics support, the Allies would have limited operational reach, risking early culmination. This could have resulted in a loss of the initiative, allowing the Germans to arrange their own forces in time and space to defeat the initial Allied foothold in Northern France.

Narrative

According to the plan for Operation Overlord, the Allies established a time line for the required buildup of forces to counter the expected German concentration of forces against the landings. Planners expected that the initial assault force had the required force ratio to defend against two German divisions. By two days after the initial assault, the Allies had to establish a beachhead to defend against an additional two divisions. After eight days, they expected to face as many as nine German divisions at their beachhead area, with three more in reserve. This anticipated threat template allowed planners to establish their own required timeline. The Allies had to arrange their operations such that they had their required operational reach at a tempo faster than the enemy could arrange the operations of their own forces.[22]

The Allied timeline involved the seizure of a series of subsequent objectives to expand the initial foothold in France. This involved more than merely transporting logistics over the shore. The Allies required these sequels in the operation to allow ground commanders to extend their operational reach in the new theater of operations through the opening of permanent logistics bases. The plan called for the capture of Cherbourg fourteen days after the initial invasion. Planners estimated that the port would support the movement of 150,000 tons of cargo onto shore by July 25, 1944 with a daily average of 8,500 tons once operational. Given the planning assumptions for the seizure and usage of the Cherbourg port, the Allies had to secure

[22] Harrison, *Cross-Channel Attack*, 77.

and repair the port as quickly as possible. They planned to accomplish this within fourteen days, but the Allies did not seize Cherbourg until June 30, 1944, twenty-four days after the invasion of Normandy. Furthermore, the Allies found the infrastructure of the port in a much worse state than anticipated. These delays degraded the tempo of Allied operations to the degree that the German commanders had the ability initiate the arrangement of their operations as they reacted to the Allied invasion.[23]

Eventually, the Cherbourg port provided the means for the Allies to continue their operations on continental Europe. Instead of the planned 150,000 tons of supplies, only 18,000 tons had moved through Cherbourg by July 25, 1944. However, by November 1944, Cherbourg facilitated the movement of 433,201 tons of supplies into Europe, which accounted for half of the total supplies up to that time. By that point, the port facilitated an average of 14,500 tons a day, which was more than 6,000 tons greater than originally expected. Without these supplies, the Allies could not have continued their break out operations in Europe. However, the delayed establishment of the full logistics capacity of the port did delay initial Allied attempts to break out from the Normandy area. While Cherbourg initially provided insufficient capacity, the determined efforts of Allied logisticians and operational units eventually made it a viable logistics base to extend the operational reach of the ground commanders.[24]

For the Mulberry harbors, the execution initially went according to plan. As early as D+1, elements of Force Mulberry began the required construction and emplacement of Mulberry A to support the Americans on Omaha Beach. This force completed the initial causeway on D+2 allowing supply movement onto the beach to increase dramatically. From June 14 to June 18, this artificial harbor supported the throughput of 8,500 tons of cargo every day. The Commonwealth

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[23] Harrison, *Cross-Channel Attack*, 88, 441; Havers, *Battle for Cherbourg*, 88.

[24] Havers, *Battle for Cherbourg*, 88.

forces also immediately began the construction of Mulberry B at Arromanches-les-Bains to support their landings on beaches Juno and Sword. The first Sherman tank moved from ship to shore over a Mulberry on June 16. During their first two weeks of operation, these artificial harbors enabled the movement of 27,500 tons of supplies ashore. This creative means of an additional logistics base significantly enhanced the Allies' operational reach in the critical early days of Operation Overlord.[25]

Unfortunately, bad weather destroyed 90% of the harbor supporting the American forces on June 19, 1944. Eisenhower sent a letter to Marshall and Admiral King on June 20 that described how the damage to the Mulberry harbors severely affected the Allies' ability to continue to bring in supplies to the assault force on the beachhead and thus increased the importance of the rapid seizure of Cherbourg. Despite the concern brought by the destruction of the American Mulberry, the operators of that artificial harbor repaired it to the degree that by June 26 it supported 14,500 tons of supply onto the beaches. Additionally, the British Mulberry harbor, protected by the Calvados Reef, remained in operation with almost no break in service for several months after the landings on D-Day. Due to the lack of enough existing port facilities, the Mulberry harbors remained in operation until November 19, achieving a maximum throughput of 136,164 tons of supplies in one week, once fully operational. The Mulberry harbors, a product of remarkable ingenuity when faced with seemingly intractable logistical challenges significantly increased the operational reach of the Allies. Without these artificial harbors, the Allies would have experienced significant operational impact within weeks of D-Day, risking culmination and

[25] Stanford, *Force Mulberry*, 8-9; Ruppenthal, *Logistical Support of the Armies: Volume I*, 277, 402, 404; Hartcup, *Code Name Mulberry*, 108-22.

eventually stabilization of the front, or even worse, a significant defeat caused by counterattacking German forces.[26]

Despite the delay in securing Cherbourg, Bradley still executed the plan to seize the Brittany Peninsula and its critical port at Brest. In the original plan, Patton's entire Third Army had the mission to clear the Brittany peninsula. However, intelligence reports indicated a lower number of German forces than expected, so Bradley ordered Patton devote only one corps to this mission. Unfortunately for the Allies, the Germans that did remain in Brittany fought tenaciously and thoroughly destroyed the infrastructure of the ports. The Americans lost many lives and a great deal of time establishing an operational port on the Brittany Peninsula.[27]

According to his memoirs, Bradley gave the order to seize Brest, thereby committing a corps to this mission which would otherwise have assisted in the fight against the Germans to the east of Normandy and assist in the breakout during Operation Cobra. Bradley committed this force to Brittany because he understood the significance of the logistics capacity the ports on the peninsula could provide. When he ordered the start of the Brittany operation, the Allies merely had the port at Cherbourg, which only supplied a third of the total Allied logistical requirements at the time. The Brittany ports would increase logistics throughput significantly; they would also allow personnel and equipment sailing from the United States to land directly into France instead of first stopping at England. Bradley and the other American commanders understood the significance of these logistics hubs and committed significant combat power to secure them at a critical point in the battle to break out from Normandy and finally restore maneuver to a long-

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[26] "Eisenhower to Marshall," June 20, 1944, *The Papers of Dwight David Eisenhower*, Volume 3, Part VIII, Chapter 19: "Single Thrust vs Broad Front" (Baltimore: Johns Hopkins University Press, 1970), 1937; Walter Bedell Smith, *Eisenhower's Six Great Decisions* (New York: Longmans, 1956), 70-73; Stanford, *Force Mulberry*, 9; Hartcup, *Code Name Mulberry*, 131-3.

[27] Bradley, *A General's Life*, 285.

stabilized front. While the mission to seize the Brittany ports did extend the operational reach of the Allies, it did not provide the additional logistics capacity that planners had predicted.[28]

In the end, the seizure of Brest proved of little value to the Allies. General Middleton's VIII Corps seized St. Malo on the northern coast of the peninsula and finally seized the city of Brest on September 19. The Germans destroyed all infrastructure of value. Furthermore, American munitions expended during the offensive destroyed many of the buildings needed to operate the port facilities. The ultimate logistics capacity provided by Brest did not justify the amount of time and material that the Americans would have to commit to repair the port. Upon taking all of these considerations into account, Supreme Headquarters Allied Expeditionary Force (SHAEF) planners recommended on September 3 not using the ports around Brest.[29]

As the Allies finally began to push the Germans from the northern French coast, their own supply lines began to extend correspondingly. After the Allied breakout these supply lines lengthened quickly, and logistical planners began to grow concerned over available support to the forces. On August 2, the chief of the SHAEF G-4 section anticipated that logistical limitations would soon affect the Allied forces maneuvering west into Brittany, south to Paris, and east along the northern coast. On August 11, the G-4 Plans Branch concluded that it could only supply the four American divisions ordered to advance to the Seine River by August 20 if the forces operating in Brittany received all of their support through Brittany ports or over the beach. A crossing of the Seine would require even more logistical support. The Allies had actually achieved their objectives from Operation Overlord with the seizure of the Seine River on August 24, eleven days ahead of schedule. Moreover, despite a temporary stabilization of the front, the

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[28] Bradley, *A General's Life*, 285-6; Martin Blumenson, *Breakout and Pursuit* (Washington DC: Center for Military History, 1993), 631-4, 655-6.

[29] Blumenson, *Breakout and Pursuit*, 655; Eisenhower, *Crusade in Europe*, 279-80.

Allies gained and maintained the initiative after D-Day and significantly increased their operational tempo upon the breakout after Operations Goodwood and Cobra. SHAEF had no desire to cede the initiative to the Germans after winning these hard-fought gains. Once again, the question came down to logistics. The Allies had nearly exceeded their operational reach, particularly given the delays and failures in establishing planned logistics bases. The ever-present specter of culmination once again threatened the tempo of the Allies' advance toward Germany.[30]

By August the Allies required a daily resupply of 20,000 tons of logistics but lacked most of their planned logistics throughput capability. Eisenhower received frequent requests for more fuel and ammunition in August and September from subordinate commanders who argued that if they only had more supplies, they could maintain their initiative and defeat the enemy, perhaps before Christmas of 1944. Eisenhower's Chief of Staff, General Bedell Smith also realized how a lack of supplies into France slowed the advance of the Allies against the Germans. By early September, the Allies began to face significant supply shortages, particularly fuel. The 21st Army Group began to drive east from its initial foothold in Northern France to seize more ports. The 21st Army Group captured Amiens on August 31. On September 12, the 21st Army Group captured Le Havre, though not before the Germans severely damaged its port infrastructure. These smaller ports increased supply capacity, but not enough to support the level of activity that Eisenhower and his subordinate commanders desired. For this, the Allies needed a larger port further east, and this requirement increased proportionate to the distance from Cherbourg to the Allies' front lines. The 21st Army Group's seizure of Amiens and Le Havre did little to expand the operational reach of the Allies.[31]

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[30] Ruppenthal, *Logistical Support of the Armies: Volume II*, 483-4.

[31] Eisenhower, *Crusade in Europe*, 290-2; Smith, *Eisenhower's Six Great Decisions*, 83-84; Ruppenthal, *Logistical Support of the Armies: Volume I*, 479-80.

Many Allied commanders and planners looked to Antwerp to solve their logistical problems. Eisenhower saw Antwerp as a critical requirement, believing that control of this port would alleviate many logistics problems and considerably extend the operational reach of the Allies. Antwerp's port was among the four highest-capacity ports in the world. In 1938, 60 million tons of freight traversed through this port. Additionally, Antwerp offered existing freight handling and distribution infrastructure to include 600 cranes and 900 storage warehouses. The port also provided access to 3,250 miles of railroad in Belgium as well as 1,370 miles of navigable water inland. The port had suffered only minor damage during the war, so most of this infrastructure remained intact, and many local residents worked as port employees and trained equipment operators. Additionally, the port itself lay 55 miles inland from the sea, thus negating tidal effects that limit the overall capacity of many ports directly on the ocean. However, that long distance from port to sea contributed to a significant delay in the Allies' ability to utilize the port.[32]

On August 24, Eisenhower ordered General Montgomery to seize Antwerp in conjunction with his 21st Army Group's continued offensive towards Germany. The British 11th Armored Division seized Antwerp and its port on September 4, before the Germans could destroy the port's infrastructure. This force traveled 250 miles in five days to capture the city and port. The rapid tempo of this offensive prevented the Germans from destroying buildings and bridges as they intended, even though they had already emplaced demolitions at many key facilities. However, while Allies held the port itself, they could not use it because the Germans retained positions along the Scheldt River, preventing movement to the harbor itself. On September 4, Hitler assigned command of the Western Front to Field Marshal von Rundstedt with instructions

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[32] Eisenhower, *Crusade in Europe*, 290-2; Ruppenthal, *Logistical Support of the Armies: Volume II*, 104-5.

to halt the Allied advance. Hitler assumed that the Allies had culminated, or would soon because of their extended lines of communication. He believed that if Rundstedt could prevent the Allied capture of any more ports and continue to control positions along the Scheldt River to prevent the Allies using the port at Antwerp, they could possibly halt the Allied advance short of Germany. The German defense near Antwerp disrupted the tempo of Allied operations to seize that key terrain, which exacerbated the already serious shortage of supplies along the Allied front.[33]

Despite the quick seizure of the Antwerp port, the British forces that captured this logistics base failed to maintain the initiative and clear enemy forces north of Antwerp, delaying its availability to the Allies as a port. In a letter to Marshall on September 14, Eisenhower explained that he temporarily gave Montgomery priority of supplies to open the approaches to Antwerp. He explained the importance of clearing enemy forces around Antwerp as critical to the overall Allied plan. In a letter to Montgomery on September 22, Eisenhower explained that he would give him whatever resources he needed to clear the approaches into Antwerp. Eisenhower needed to arrange his operations quickly to secure the usage of Antwerp as a logistics base.[34]

Eventually Montgomery arranged the operations of his forces by assigning General Crerar, commander of the Canadian First Army, the task to clear the Scheldt Estuary. The required naval and land forces did not assemble for the final assault until late October. Even after the Allies defeated the Germans along the Scheldt Estuary, the naval force took an additional two weeks to clear all the mines that the Germans emplaced. This delay in opening Antwerp disrupted

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[33] "Eisenhower to Montgomery," August 24, 1944, *The Papers of Dwight David Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust vs Broad Front", 2090-1; Ruppenthal, *Logistical Support of the Armies: Volume I*, 480; Ryan, *A Bridge Too Far*, 36-37, 60.

[34] Ryan, *A Bridge Too Far*, 61; "Eisenhower to Marshall," September 14, 1944, *The Papers of Dwight David Eisenhower*, Volume 4, Part VIII, Chapter 22: "Single Thrust vs Broad Front", 2143-5; "Eisenhower to Montgomery," September 22, 1944, *The Papers of Dwight David Eisenhower*, Volume 4, Part IX, Chapter 23: "Opening Antwerp", 2175.

the Allied tempo even further. Eisenhower wrote in *Crusade in Europe* that his forces might have made the port at Antwerp operational much sooner had Operation Market Garden not consumed so much of Montgomery's forces and attention. Eisenhower allowed Montgomery to convince him of the promise of a deep thrust across multiple bridges into Germany to achieve a rapid victory. Not only did this quick victory prove elusive, it led to an arrangement of operations along the Allied front that had many negative effects, including failure to secure the logistics base at Antwerp on the planned timeline. The first Allied ship entered Antwerp's port on November 26. The Allies at last possessed a major port facility on the shores of Northern Europe close to Germany five and a half months after their initial assault onto the beaches of Normandy. The Allies had extended their operational reach just enough to prevent culmination in that time through careful arrangement of operations, maintaining tempo as best as possible given limited logistics bases. The tempo of Allied operations increased after Antwerp achieved full operational status, but the unconditional surrender of Germany would not take place until well after Christmas of 1944.[35]

Analysis

Throughout operations in Western Europe, Allied planners consistently placed priority on finding adequate logistics bases to extend the operational reach of their forces. As their lines of operation extended from the beaches of Normandy east towards Germany, their lines of communication grew longer and more tenuous as well. To prevent culmination, planners had to arrange operations carefully to extend their operational reach. The need for logistics bases to bring additional personnel and equipment into the European theater played a critical role in the objectives of operations. As the Allied lodgment continued to expand beyond the initial foothold

[35] Eisenhower, *Crusade in Europe*, 326-8; Smith, *Eisenhower's Six Great Decisions*, 86.

in Normandy, planners had to find a means to continue the shipment of supplies into the theater. This required adequate infrastructure to support this need as well as locations close to the forward line of troops.

Operational reach remained a key consideration throughout Allied operations in the European Theater. This resulted not only in several operations aimed at securing selected ports to increase logistics throughput, but also in the arrangement of Allied operations to achieve as much as possible despite a constant shortage of critical resources like fuel and ammunition. The Allies conducted operations to secure several ports to extend their operational reach in the theater. Cherbourg and the Mulberry harbors provided just enough operational reach to expand their initial lodgment far enough inland from the beaches of Normandy to build combat power and prepare for an eventual breakout operation. The Brittany Peninsula provided no significant increase to the operational reach for the Allies. The port at Cherbourg and the Mulberry harbors only provided adequate operational reach to achieve the initial objectives of Operation Overlord. The Allies managed to extend their front line to the Seine River, but they experienced significant difficulty continuing operations beyond that point. They required the port at Antwerp—a port they did not secure for another five and a half months—to have the operational reach required to complete their offensive into Germany. Eisenhower wrote to Marshall on September 25, 1944 that until they had access to the Antwerp port, they were "always going to be operating on a shoestring."[36]

Given the limited operational reach of the existing and artificial ports in Northern France and the long delay in securing additional port facilities, the Allies faced the possibility of culmination from the beginning of their operations in Western Europe. The supplies transiting the

[36] "Eisenhower to Marshall," September 25, 1944, *The Papers of Dwight David Eisenhower*, Volume 4, Part IX, Chapter 23: "Opening Antwerp", 2187-8.

Allied ports allowed commanders to maintain the momentum against the Germans through the original objectives of Operation Overlord. Once past that point, Eisenhower had to manage the distribution of limited supplies to his subordinates carefully. This constraint forced Allied commanders to curb their momentum and, after missteps during Operation Market Garden, carefully maintain a broad front and manageable tempo. With these limitations, the Allies nearly ceded the initiative that they had achieved on D-Day to the Germans. The opening of the Antwerp port finally provided the Allies the means necessary to maintain offensive momentum and prevent any further significant risk of culmination, although careful management of supplies and operational tempo remained one of Eisenhower's key concerns.[37]

The Allied commanders and planners arranged operations in a superb manner given the existing infrastructure limitations to extend their operational reach and mitigate culmination as best as they could. The actions on D-Day demonstrated the adherence to maximizing opportunities and options for commanders on the ground. Allied planners increased the assault forces for the actual invasion to increase the depth of combat power initially on the beach. Furthermore, the innovation involved with the Mulberry harbors added simultaneity to Allied logistics as supplies could arrive through artificial harbors as well as through existing ports. While the existing ports such as Cherbourg provided limited capabilities, multiple options allowed a greater flow of supplies than would have otherwise existed. Regarding the tempo of the operation, Allied planners did prepare the sequel of Patton's 3rd Army to seize the Brittany Peninsula with the subsequent change of decreasing the size of that force after a refined understanding of the situation on the ground. However, the sequel that planners did not prepare adequately enough in advance involved the seizure and opening of the Antwerp port. Given the

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[37] Charles B. MacDonald, *The Siegfried Line Campaign* (Washington DC: Center for Military History, 1993), 392-3.

ability to use that port when they first seized the city itself, the Allies would have had a greater capability to maintain their tempo relative to the German Army.

There can be little doubt that the commanders and planners in the European Theater constantly concerned themselves with the need for logistics. Given Hitler's hold on Western Europe in early 1944, the Allies knew that they would rely on seaports to provide their forces with the means to defeat the Germans. Planners and commanders focused on adequate port facilities to serve as logistics bases to ensure they could extend their operational reach. This focus on the criticality of ports started with initial invasion planning and continued until the opening of the port at Antwerp, and ultimately the completion of Allied operations in Western Europe upon securing Germany's unconditional surrender in the spring of 1945.

Operation Just Cause

Background

The United States' national interests in Panama arose in 1903 when President Theodore Roosevelt supported a Panamanian revolution from Columbia followed by the ratification of the Hay-Bunau-Varilla Treaty to permit the United States to build the Panama Canal. Upon its completion, US military forces deployed to the Canal Zone to protect American interests. The US Army established its first formal headquarters in Panama City in 1915. Over time, the military expanded its footprint in Panama and established Southern Command (SOUTHCOM) in 1963 to command all US military forces in the area, where America maintained a force that averaged about 10,000 service members. The United States established its headquarters at Fort Clayton north of Panama City. On the south side of the Panama Canal, Howard Air Force Base, co-located with Fort Kobbe, provided the major airfield for the United States. Fort Sherman, Fort Davis, and Coco Solo Naval Station protected the Panama Canal at its connection to the Caribbean Sea. Additionally, both American and Panamanian troops inhabited Fort Amador to

the south of Panama City. These existing permanent bases would serve as ideal logistics bases for future operations in Panama.[38]

Panamanian nationalists began to seek complete control of the Panama Canal around the middle of the twentieth century. In 1972, General Omar Torrijos seized power in Panama, later negotiating a treaty with President Carter, signed in 1977, which dictated the transfer of the Panama Canal Zone to the Panamanian Government on December 31, 1999. However, Carter and Torrijos negotiated a second treaty that committed both countries to enforce the neutrality of the Panama Canal, and this treaty specified no termination date. These treaties would provide a contentious pretext for the United States' invasion of Panama in 1989.[39]

When Torrijos died in August 1981, Manuel Noriega began his rise to power. He became chief of staff of Panama's army in August 1983 and later completely controlled the Panamanian military, renaming it the Panama Defense Forces (PDF). After his surrogate won the presidential election in 1984, Noriega essentially ruled Panama as a dictator. When Noriega removed the elected president in 1986, President Reagan decreased aid to Panama by 85 percent. Noriega's relationship with America's government continued to deteriorate, and in February 1988, an American Federal Grand Jury indicted Noriega on drug trafficking charges.[40]

Noriega defeated one coup attempt in March 1988 by exacting brutal repression against anyone deemed disloyal. He thwarted another coup attempt in October 1989 led by many of the PDF officers who had come to his assistance in 1988. Noriega rallied PDF elements from Rio

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[38] Yates, *The U.S. Military Intervention in Panama*, 3, 26-27; Briggs, *A Soldier's Eyewitness Account*, 14; Donnelly, Roth, and Baker, *The Storming of Panama*, 3-5.

[39] Yates, *The U.S. Military Intervention in Panama*, 6-7; Donnelly, Roth, and Baker, *The Storming of Panama*, 4-9.

[40] Flanagan, *Battle for Panama*, 4-9; Donnelly, Roth, and Baker, *The Storming of Panama*, 6-12.

Hato who landed at the Tocumen Air Base, and he used existing infrastructure—an airfield in particular—to concentrate loyal forces to overwhelm the coup plotters. American planners would take note of this as they planned their own operation to remove Noriega from power. Not only would they have to arrange their operations to increase their operational reach, but they would also have to mitigate Noriega's capability to do the same.[41]

As the United States distanced itself from Noriega, the Joint Chiefs of Staff directed General Frederick Woerner, commander of SOUTHCOM, to prepare contingency plans for the removal of Noriega. After Noriega's indictments in early 1988, Brigadier General Marc Cisneros (SOUTHCOM J-3) initiated a group of contingency plans known as Elaborate Maze. These plans called for a large increase in the number of American military personnel stationed in Panama. This increase in combat power would provide the capability to pressure Noriega with overwhelming American force that would either cause him to lose legitimacy among the populace and the PDF, or provide adequate forces to remove him by force if necessary. This plan sought the swift capture of Noriega so that he could not disappear into the Panamanian countryside, and advocated a gradual but significant increase in mass of combat power rather than an operational approach involving surprise. Despite these signals from the Reagan administration, Noriega continued his repressive actions against political opposition.[42]

In May 1989, Panama held a presidential election. Despite reports that Noriega committed election fraud, the opposition candidates managed to win the election. However, Noriega refused to accept the results and used the PDF to prevent the elected administration from

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[41] Flanagan, *Battle for* Panama, 4-9; McConnell, *The Real Story of America's High-Tech Invasion of Panama*, 6, 10-11, 29; Yates, *The U.S. Military Intervention in Panama*, 31.

[42] Ronald H. Cole, *Operation Just Cause: The Planning and Execution of Joint Operations in Panama, February 1988–January 1990* (Washington, DC: Joint History Office, 1995), 7-8.

taking power. As tensions escalated, the recently elected President George H. W. Bush initiated Operation Nimrod Dancer and deployed 1,000 Soldiers from 7th Infantry Division (Light), 165 Marines, and 762 Soldiers from 5th Infantry Division (Mechanized) to Panama. These additional forces used the existing American logistics bases to increase the operational reach of SOUTHCOM leaders in Panama quickly.[43]

After the failed Panamanian election, the Bush administration changed its approach towards Noriega. President Bush replaced Woerner with a more aggressive commander. General Maxwell Thurman took command of SOUTHCOM on October 1, 1989 and changed the concept for Operation Blue Spoon—the operation to remove Noriega by force—from a concept based on mass to one based on surprise. This change in the arrangement of operations led to a condensed timeline that required extending the operational reach of SOUTHCOM forces. Thurman requested Lieutenant General Carl Stiner, commander of the XVIII Airborne Corps, to serve as his commander of Joint Task Force South. Thurman increased the usage of special operations forces and requested the 75th Ranger Regiment and 82nd Airborne Division to provide a forced entry capability. Stiner selected objectives that would enable him to attack to defeat the PDF and simultaneously capture Noriega. The critical objectives for the assault included the airfields at Rio Hato and the Torrijos-Tocumen Airfield. An American operation to capture Noriega would succeed only if the plan prevented the usage of this infrastructure by the PDF. Additionally, American forces would require these airfields to expand their own operational reach.[44]

To execute this operation, planners had to take into account the revised Field Manual 100-5, *Operations* (FM 100-5), published in 1986. This manual did not exist during America's

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[43] Donnelly, Roth, and Baker, *The Storming of Panama*, 44-47; Cole, *The Planning and Execution of Joint Operations in Panama*, 10-11.

[44] Cole, *The Planning and Execution of Joint Operations in Panama*, 12-14; Flanagan, *Battle for Panama*, 33-34, 47-48.

most recent projection of military force, which took place during Operation Urgent Fury in Grenada in 1983. The 1986 version of FM 100-5 maintained many aspects of the 1982 version of AirLand Battle to include the tenets of initiative, agility, depth, and synchronization. This manual also codified *operational art* in Army doctrine. While AirLand Battle did not list today's elements of operational design, the doctrine did include many similar elements such as culmination, tempo, branches, and sequels, with nearly identical definitions to those found in the most recent edition of Joint Publication 5-0, *Operations* (JP 5-0). The doctrine also outlined the need to either create a logistics base in the theater of operations or rely entirely on external support. The manual further highlighted the need to protect air bases for logistics support. Given the new guidance from Thurman to prioritize surprise over mass, and the new concepts contained in the recently updated doctrine, SOUTHCOM planners finalized Blue Spoon for the removal of Manual Noriega from power in Panama. They would rely on an arrangement of operations that incorporated surprise and a quick expansion of the command's operational reach.[45]

Narrative

On the afternoon of December 17, 1989, President Bush authorized the execution of Operation Blue Spoon—soon to receive the revised name Operation Just Cause—with an H-Hour of 0100 on December 20. The events that finally persuaded President Bush to authorize the operation took place on December 16, 1989. After declaring himself Maximum Leader of Panama, Noriega claimed that a state of war existed between Panama and the United States. That night a car of four Marine officers came across a PDF checkpoint in Panama City. While attempting to avoid the roadblock, the PDF fired at the vehicle as it sped away resulting in the

[45] Field Manual (FM) 100-5, *Operations, 1986* (Washington, DC: Government Printing Office, 1986), 2, 10, 13, 15, 25 30-31, 181; Cole, *The Planning and Execution of Joint Operations in Panama*, 1.

death of one Marine. A Navy lieutenant with his wife watched this event unfold before them at the same checkpoint. PDF personnel kidnapped the couple and assaulted both during an interrogation. These events convinced President Bush that only the projection of American combat power into Panama to remove Noriega from power would resolve the longstanding issues surrounding the governance of Panama and its effect on US strategic interests.[46]

With the implementation of Operation Just Cause, Stiner as the Joint Task Force Commander oversaw the seizure of multiple objectives by both conventional and special operations forces in a matter of hours. His arrangement of operations at a quick tempo would lead to the efforts to extend the American operational reach and prevent the PDF from concentrating quickly enough to react effectively. Due to a loss of operational surprise, Stiner moved the designated H-Hour forward, from 0100 to 0045, hoping this would help his forces maintain the fast paced tempo. Several units already stationed in Panama established roadblocks along key intersections to prevent the concentration of the PDF. At 0055, elements of the 75th Ranger Regiment conducted an airborne insertion onto Torrijos-Tocumen Airfield just east of Panama City. At 0103, the rest of the 75th Ranger Regiment initiated an airborne operation at Rio Hato.[47]

The Rangers conducted airborne operations onto these existing airfields to achieve certain key objectives. Colonel Buck Kernan, the Regimental Commander, had the task of seizing the Torrijos-Tocumen Airfield and expanding that airhead to allow the 82nd Airborne Division to conduct its subsequent airborne operation. The Rangers had to seize and clear the Rio-Hato Airfield for immediate usage of landing aircraft. Within 90 minutes, the Rangers cleared that runway, enabling C-130 cargo aircraft to land. This rapid seizure and clearance of existing

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[46] Cole, *The Planning and Execution of Joint Operations in Panama*, 29-30; McConnell, *The Real Story of America's High-Tech Invasion of Panama*, 16-18.

[47] McConnell, *The Real Story of America's High-Tech Invasion of Panama*, 33, 39, 83-91, 99-103, 111, 144-6.

infrastructure allowed JTF South to extend its operational reach quickly as more forces entered the theater of operations. While the Rangers seized their objectives, a Navy Sea, Air, Land (SEAL) team seized control of Paitilla Airport where Noriega maintained his private jet. To limit the chances of Noriega evading capture, American forces had to remove all possible avenues of escape.[48]

At 0211, eight C-141's flew over the Torrijos-Tocumen Airfield as 900 paratroopers from the 82nd Airborne Division parachuted into Panama. Twenty-eight C-141's had dropped hundreds of tons of equipment including food, ammunition, and eight Sheridan tanks just minutes prior to the troop insertions. This sudden increase in combat power in the theater greatly extended the operational reach of commanders. While the Rangers initially secured the airfield prior to the arrival of the 82nd paratroopers, planners determined that they would extend the operational reach of the ground commanders with an airborne insertion instead of an air landing process. The planners looked at the invasion of Grenada where the increased time required in clearing the airfield of all debris and enemy air defense capabilities actually slowed the tempo of that operation. By inserting troops via parachute versus traditional airplane transport, the invasion force expedited the tempo of the operation.[49]

As C-141's dropped paratroopers over existing civilian airfields, additional aircraft brought soldiers of the 7th Infantry Division from Fort Ord, California to Howard Air Force Base. Howard Air Force Base also accommodated the refueling of the empty aircraft after their airborne

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[48] Mir Bahmanyar, "Modern Rangers: Panama," accessed January 23, 2015, http://www.suasponte.com/m_panama.htm; McConnell, *The Real Story of America's High-Tech Invasion of Panama*, 47, 53.

[49] McConnell, *The Real Story of America's High-Tech Invasion of Panama*, 185-6, 193; John W. Turner, "The Adequacy of Logistic Support," in *Operation Just Cause: The U.S. Intervention in Panama*, ed. Bruce W. Watson and Peter G. Tsouras (Boulder: Westview Press, 1991), 124.

operations before their return to the United States. The increase in traffic on this airfield taxed the limits of its capabilities. Ideally, the Air Force could establish another refueling point at the Torrijos-Tocumen Airfield, but that airfield was not yet clear of enemy personnel or equipment from the airborne operation. While Howard Air Force Base offered a secure and ready logistics base, the sudden surge of aircraft stretched its capabilities. Air Force personnel had to manage this unforeseen backlog to prevent culmination.[50]

Within a week of the commencement of operations, an additional seven thousand soldiers from the 7th Infantry Division, 16th Military Police Brigade, and various civil affairs, and psychological troops arrived in Panama, bringing the total number of military personnel in Panama to twenty seven thousand—over two and a half times the number of American military personnel that operated in Panama on a routine basis. In addition, the Military Airlift Command flew in enough aid to feed fifty thousand people for thirty days by December 26. This rapid expansion of personnel and equipment in the theater of operations occurred due to the successful usage of multiple logistics bases.[51]

On January 3, 1990, General Colin Powell ordered Thurman to begin the redeployment of the additional forces brought into Panama for Operation Just Cause. By the end of January, SOUTHCOM's personnel numbers returned to normal operating strength. Once again, SOUTHCOM used secure airbases to transit personnel out of the theater of operations. The arrangement of SOUTHCOM's operations allowed its commanders to extend their operational reach quickly through the seizure of civilian airfields and usage of existing air bases. This focus on utilizing airfields as logistics bases prevented the culmination of American forces.[52]

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[50] McConnell, *The Real Story of America's High-Tech Invasion of Panama*, 188-9.

[51] Cole, *The Planning and Execution of Joint Operations in Panama*, 38.

[52] Ibid., 68.

Analysis

American forces in Operation Just Cause experienced a unique situation. While the United States did project power from the Continental United States to another country, the American military already possessed a robust structure and organization in the designated theater of operations. As the permanent headquarters to SOUTHCOM, the United States military already had a thorough understanding of the operational environment and controlled existing infrastructure that it could utilize to support operations. However, thorough analysis demonstrated that the need to project the desired amount of combat power into Panama quickly enough to achieve the desired objectives would require the military to seize civilian airfields to augment Howard Air Force Base.

SOUTHCOM planners realized that they needed to seize operational logistics bases in the opening phases of the operation. While Howard Air Force Base did offer a secure and functional logistics base, it had limits. Given the amount of combat power brought into the theater in a short time period, planners looked to other locations. Specifically the Rio-Hato and Torrijos-Tocumen Airfields would facilitate the rapid insertion of the 75th Ranger Regiment and 82nd Airborne Division. These units specialized in airfield seizure, which allowed them to establish control of these airfields quickly and later clear them of all debris and enemy threat to allow future usage by fixed wing aircraft. While SOUTHCOM leaders needed to expand their own control of logistics bases, they also had to deny Noriega the ability to utilize these same bases. They had to prevent the PDF from using these bases to concentrate combat power as they had done when they successfully thwarted the previous coup attempt. They also had to control these bases to prevent Noriega from fleeing Panama City.

While SOUTHCOM did maintain an average operational strength of several thousand personnel, planners realized that they needed to increase their original operational reach to defeat the PDF. The original plan that Woerner approved called for a gradual increase of personnel.

Thurman's operational approach called for a rapid buildup of combat power as a more effective way to ensure that American forces could achieve their military objectives. To facilitate this rapid increase of combat power in Panama, SOUTHCOM had to utilize strategic assets such as the Military Airlift Command. Only with the assistance of this national asset could SOUTHCOM increase its operational reach to defeat Noriega.

Planners for Operation Just Cause had to determine how to increase their operational reach while minimizing the risk of culmination before successful mission completion. SOUTHCOM had the luxury of an existing airfield at Howard Air Force Base, but this airfield could not accommodate enough aircraft to execute Thurman's plan. This led the planners to integrate airborne operations by the 75th Ranger Regiment and 82nd Airborne Division to secure enemy held terrain and achieve mission objectives before culminating. Planners referred to Operation Urgent Fury to understand that an air landing operation actually takes longer to conduct. This additional time to project combat power would have delayed the operation and given the PDF the opportunity to seize the initiative, and Noriega time to evade capture. This provided the insight required to see the need to seize multiple airfields to augment the throughput capacity of Howard Air Force Base, enabling SOUTHCOM to extend its operational reach rapidly without a risk of culmination.

The arranging of operations to seize these airfields allowed American forces the ability to extend their own combat power into the theater of operations. The successful retention of these airfields also prevented the PDF from concentrating at any one location and denied Manual Noriega the ability to flee the country. Thurman placed an emphasis on surprise for this operation. He understood that achieving surprise required the ability to build combat power quickly in the theater, providing critical insight regarding the essential role that tempo played throughout this operation. Looking at the attempted coup in October, American planners knew they had to concentrate and mass friendly forces before the PDF could react. This insight also led

Stiner to accelerate the initiation of the operation by fifteen minutes to ensure that US forces achieved and maintained the rapid tempo after a loss of operational security in the original plan.

The key to Thurman's operational approach for Operation Just Cause lay in a rapid organization of operations. He relied on surprise to overwhelm the PDF with a swift increase in combat power in the theater. To extend his operational reach in this environment without facing culmination, he relied on existing infrastructure as well as Military Airlift Command. Howard Air Force Base provided a safe and operational logistics base, but the rapid increase in personnel required the airborne operation to seize additional airfields. The quick seizure of these airfields enabled the extended operational reach at a quick tempo while mitigating the possibility of culmination.

Synthesis

For both operations in Western Europe during World War II and in Panama during Operation Just Cause, the United States military projected combat power into a theater of operations. In both cases, a determined enemy offered resistance against those military forces. For each operation to succeed, operational planners had to determine the means required for commanders to arrange operations to extend their operational reach and prevent culmination. In each case, US military forces employed different means to utilize logistics bases available to sustain the operation or increase the available infrastructure by building or seizing it as part of the plan. Operational planners can refer to the common elements of these operations to identify both key planning considerations and specific means to analyze particular tasks like expanding the lodgment of forces in a new theater of operations.

In World War II, the Allies planned for two logistics bases to extend their operational reach upon the commencement of Operation Overlord. The Allies planned to use the port at Cherbourg as their primary logistics base. The seizure of this existing infrastructure would allow the Allies to extend their operational reach into France. As a supporting effort, the Allies also

fabricated the Mulberry harbors to provide a limited means to extend their operational reach into the theater until the point when Cherbourg became fully operational. Allied commanders arranged their operations to employ these means to maintain their desired tempo. Allied leaders knew that they had to expand their beachhead line before the Germans could counterattack. In addition to lodgments near the site of the initial landings—using both existing and fabricated infrastructure—the Allies anticipated the requirement to build on the original landing plans by seizing additional infrastructure at the port at Antwerp to maintain operational reach as Allied forces advanced towards Germany. In each of the cases operational planners looked for ways to utilize infrastructure as logistics bases to extend the operational reach. They realized that failure to secure and employ the necessary infrastructure could lead to early culmination, placing the success of the mission at risk.

The differences in the situations between World War II in 1944 and Operation Just Cause in 1989 highlight important considerations for future operations. During Operation Overlord in 1944, Allied forces placed significant combat power into a theater of operations completely controlled by the enemy. During Operation Just Cause in 1989, US forces increased American combat power in a country that already had a significant American presence. Seaports served as the logistics bases during Operation Overlord. These seaports could accommodate a large number of personnel and equipment but required a significant amount of time to establish. During Operation Just Cause, existing airports served as the required logistics bases. This infrastructure proved readily available but had a significant constraint in throughput for personnel and equipment. Finally, in World War II, Allied forces prepared to operate in the theater of operation for months; in some cases units prepared for years. In Just Cause, the additional forces projected into the theater had a relatively short notice and many departed Panama within just a few weeks. The unique conditions of each operation led planners to make certain decisions about what type

of logistics base they would use and how much effort they would place in repairing existing bases or establish new ones for continued operations.

In World War II, Allied planners expected to require a significant increase in personnel and equipment in Western Europe after the initial assault at Normandy. For this reason, they required infrastructure that would support a large quantity of sustainment for a long period of time. Seaports served as the logical means to support these requirements. While the seaports offered the ability to extend the operational reach of Allied commanders given a significant investment in resources, the existing infrastructure did not offer the full capability required at the commencement of Operation Overlord. In Operation Just Cause, SOUTHCOM planners required a quick increase of personnel with the expectation that the increased strength would not remain in country for a long period. This led planners to focus on airports as the critical logistics bases because they could provide the necessary throughput quickly, even though a given airfield could not support a particularly large throughput of logistics. In each situation, operational planners analyzed existing capabilities and determined the best means to secure and utilize a logistics base that would adequately extend the commander's operational reach. Each situation required operational planners to determine how to arrange operations to extend the operational reach of the force to prevent culmination. In each case, planners evaluated these same factors, but found different means to solve the problem at hand.

Conclusion

Historical examples provide critical lessons for future operational planners regarding logistics bases and their ability to extend a force's operational reach. Just as planners did in the foregoing analysis of the Cherbourg and Antwerp ports in World War II and the airfields used in Operation Just Cause, planners often look to existing infrastructure to provide the necessary logistics infrastructure. Planners should maintain that focus in future operations, as use of existing facilities will allow for quicker establishment of the logistics base. However, planners must also

remember the unique factors present in any given situation and take all of those into consideration when developing their logistics support plan. When projecting combat power into a new theater of operations, the time required to expand the lodgment will continue to play a critical role in selecting the location of that initial lodgment. This will prove especially important in situations where the enemy will try to deny the ability of the commander to expand his operational reach. Planners must provide a means to maintain a rapid tempo for the expansion of the lodgment.

While using existing infrastructure is often ideal, planners must also take into consideration the current capabilities of that infrastructure. While Allied planners chose Cherbourg as an initial logistics base due to existing infrastructure, the enemy destroyed the port to such a degree that it would not serve as a functioning logistics base for a longer time than expected. Due to their branch plan of the Mulberry harbors, the Allies could still expand their initial lodgment in Northern France. Planners in Panama prepared for the branch plan of refueling aircraft at the Tocumen Airport, but they did not have to execute that plan. Planners must continue to look for multiple options to extend the commander's operational reach in a theater with multiple branch plans.

Should planners expect an operation to continue in a theater over an extended time and space, they must consider successive phases of their plan, and include options to develop additional logistics infrastructure when and where necessary to maintain the desired tempo of operations. While the Allies adequately prepared to expand their lodgment around Normandy, they did not conduct enough long range planning for future lodgments, such as Antwerp. Due to the failure of extended planning, the Allies did not utilize that infrastructure for several months after the initial landings. As such, planners cannot focus exclusively on the initial lodgments for the operation but must also plan to establish additional lodgments in later phases to maintain an extensive operational reach.

To facilitate these plans, the Army must organize and train to establish and expand the infrastructure at the lodgment. The Engineer Branch does have current doctrine to establish seaports and airports. FM 3-34, *Engineer Operations* describes the role of engineers to support unified land operations to enable force projection and logistics through means such as building and preserving seaports, airports, and bases. For the purpose of mission command of engineering operations in a theater, FM 3-34 describes the functions of the theater engineer command. One function of this *headquarters* is to "maintain primary responsibility for theater infrastructure development." Technical Manual 3-34.73, *Port Construction and Repair* highlights the importance of a seaport in a theater of operations and the means to create and maintain seaports conducted by engineer dive teams. Field Manual 5-430-00-2, *Planning and Design of Roads, Airfields, and Heliports in the Theater of Operations-Airfield and Heliport Design* provides examples of various methods to plan for construction and protection of airfields in a theater of operations. The Engineer Branch has multiple horizontal construction units that can establish and maintain airfields in an austere environment. The Engineer Branch therefore has the necessary doctrine and organization to plan, establish, and maintain sea and airports in a new theater of operations.[53]

Ultimately, future planners will have to examine the factors of expected enemy resistance in the theater of operations, time available, and the existing infrastructure capabilities against the nature of the operation when determining how to establish a lodgment in a new theater of operations. The Engineer Branch does have the doctrine and organization to create the necessary infrastructure. Given that the US Army will most likely conduct future operations in an austere

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[53] FM 3-34, 2-7; Technical Manual (TM) 3-34.73, *Port Construction and Repair* (Washington, DC: Government Printing Office, 2013), 1-1; Field Manual (FM) 5-430-00-2, *Planning and Design of Roads, Airfields, and Heliports in the Theater of Operations-Airfield and Heliport Design* (Washington, DC: Government Printing Office, 1994), 10-1.

environment without a significant preexisting presence, planners must look to arrange operations to establish a logistics base quickly that will extend the commander's operational reach and prevent a culmination of the force while maintaining the desired operational tempo.

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