Designing the Victory in Europe

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THE U.S. ARMY is currently wrestling with the concept of "design" as an advanced application of problem management.[1] Design was first inserted into U.S. Army doctrine in 2006 with the incorporation of a campaign design chapter in Field Manual (FM) 3-24, *Counterinsurgency*, which was followed-up with references to design in both the U.S. Army's capstone manual, FM 3-0, *Operations* and the revised manual for dealing with post-hostility operations, FM 3-07, *Stability Operations*. The inclusion of a chapter outlining the design process in the current version of the Army's key doctrinal reference for planning—FM 5-0, *The Operations Process*—has elevated the concept of design to the level of capstone doctrine.

Despite the previous years of debate and revision of design doctrine, acceptance and inculcation of design into the problem-management processes of U.S. Army units in the field appears tentative.[2] The probable explanation for this is that the concept of design was not thoroughly tested by the field prior to its inclusion in doctrine. This is a lesson the Army has learned before, catalogued in exacting detail in two remarkable TRADOC publications, John Romjue's *From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982*, published in 1984, and Major Paul Herbert's *Deciding What Has To Be Done* (Leavenworth Paper #16), published in 1988.

To summarize these two works, the publication of the Active Defense doctrine in the 1976 version of FM 100-5, *Operations,* led to a period of "spirited debate" and—more significantly—serious experimentation by the field headquarters (such as V Corps) who would have to operationalize the concepts. "While generally well accepted, [the 1976 version of FM 100-5, *Operations*] raised penetrating questions, even among its admirers, and the general critique was wide ranging."[3] As a result, in 1979 then-TRADOC commander, General Donn Starry, instituted a new doctrinal process that emphasized "operational concepts [that] did not become doctrine until tested, approved, and accepted" by the field Army force.[4] In other words, General Starry and his doctrine team recognized that only experimentation

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PHOTO: Senior military officials aboard the USS *Augusta* observing the Normandy invasion, June 1944. (U.S. Navy)

with concepts would address "the misgivings that existed within the Army itself about the doctrine of the active defense—misgivings which the debate did not satisfactorily resolve."[5]

Until the experimentation process can catch up, another way to alleviate the hesitation of units to accept design might be the examination of practical, historical examples upon which to base understanding. Although obviously the critical concepts inherent in the current military application of the Army Design Methodology, such as systems-theory, complexity, and problem framing, would not have been familiar to military planners, the basic premise of how design "fits"—the integration of conceptual thinking and detailed planning—is not necessarily new.[6] The purpose of this article is to provide a sort of "case-study" for the application of design.

In January of 1943, one year before General Dwight Eisenhower or Field Marshal Bernard Montgomery began to consider the problem-set of Normandy, the Combined Chiefs of Staff of the United States and United Kingdom decided "the time had come to begin the detailed development of the Overlord plan."[7] Subsequently, the chiefs appointed British Lieutenant General F.E. Morgan as Chief of Staff, Supreme Allied Commander (COSSAC), and tasked him to build and lead a team to provide "the basis for the subsequent development of detailed plans."[8] The efforts of the COSSAC staff and their relationship to the subsequent preparations made by Eisenhower and his staff are a case study for the development of a campaign design that was operationalized through detailed planning.[9]

Understanding Design

The U.S. Army views the Army Design Methodology as a broad problem-solving approach that integrates detailed planning with "critical and creative thinking" through iterative problem-framing to generate "a greater understanding, a proposed solution based on that understanding, and a means to learn and adapt."[10]

Design requires commanders to "lead adaptive work" and "engage in learning through action" to verify they are solving the right problem, rather than solving the problem right.[11] As a cognitive methodology, the design approach examines a problem from three perspectives—the environment, the problem, and the operation.

(U.S. Army)

General Donn A. Starry.

Examination of the environment builds understanding about why the current situation (the "observed system") is different from the commander's intent (the "desired system"). Framing the problem entails visualizing the tensions between the "observed system" and the "desired system" to determine actions required to transform the system. The concept for affecting this transformation is termed the operational approach, which entails developing a "broad conceptualization of general actions" that "provides the logic" to guide the development of courses of action during (subsequent) detailed planning. In terms of campaign development, the operational approach outlines parallel and sequential actions, often manifested as lines of operation or lines of effort and described, according to FM 3-0, through the elements of operational design. As design is meant to be integrated with detailed planning, the "output" or final result of the process is a design concept that reflects "understanding of the operational environment and the problem while describing the commander's visualization of a broad approach for achieving the desired end state."[12]

A historical example that is congruent with the doctrinal explanation of the Army Design Methodology may prove useful for examining how the U.S. Army applied design during war fighting.

(Library of Congress, Division. LC-USZ62-25600)

General Dwight D. Eisenhower talks to paratroopers in England just before they begin the Allied invasion of Europe. These soldiers are with Company E, 502nd Parachute Infantry Regiment (Strike), 5 June 1944.

Using this methodology, the application of Design is characterized by:

- Applying critical and creative thinking.
- Emphasizing the conceptual (versus the detailed).
- Leveraging subject matter experts.
- Emphasizing continuous learning.
- Applying a continuous, iterative, cognitive methodology through problem-framing and re-framing.

The efforts of Lieutenant General Morgan and the COSSAC staff during World War II represent a design approach to campaign development. It aligns with the U.S. Army's current thinking about the application of Design to military problem management.

Designing the Victory in Europe

On the 5th and 6th of June, 1944, Allied forces under the supreme command of General Dwight Eisenhower initiated Operation Overlord. The combined air/sea assault that commenced Overlord involved more than 5,000 landing craft (protected by over 700 warships) carrying five Allied divisions and the insertion of three parachute divisions by over 1,000 transports and gliders, all supported by over 4,000 fighter and bomber aircraft. The nearly 130,000 soldiers, airmen, sailors, and marines of seven nations that conducted this assault represented the vanguard of a force that would eventually number more than four million and, in less than a year, prove capable of defeating Nazi Germany.[13] The orchestration of the tactical missions, logistical preparations, sea-borne movement, establishment of air superiority, preparatory bombardment and fire support, and indirect control of partisan forces represented an immense and complex undertaking.

The success of Operation Overlord in June 1944 began 18 months earlier with the efforts of Morgan and his COSSAC team. The stated objective of COSSAC was to begin the formal planning for three operations: deception operations in 1943

(Cockade), a rapid return to the continent in the event that Germany surrendered (Rankin), and a "full scale assault against the continent in 1944 (Overlord)."[14] Given a general time frame (summer 1944), a generic geographical orientation (northern France), and an estimate of available forces (five assault divisions), the COSSAC team was tasked with the "development of the Overlord operation from a strategic conception into a final attack plan."[15] Morgan quickly realized that an effort to build a campaign as wide-ranging as an assault on Germany through northwest Europe to end the war required more than just traditional military planning. To accomplish this, the COSSAC staff applied a design-centric approach that emphasized critical and creative thinking, focused on broad concepts, employed experts, and built processes for continuous learning through an iterative methodology of problem-framing.

Critical and creative thought. To focus the efforts required for dealing with a problem-set of Operation Overlord magnitude, the staff applied critical and creative thinking to "clarify objectives in the context of the operational environment and within the limits imposed by policy, strategy, orders, or directives."[16] The controlling idea that enabled the COSSAC staff to forego the traditional techniques of military planners and adopt a more design-centric approach was a recognition that their proper role was to set conditions for future planning efforts. As Morgan himself identified early in the process, the methodologies of the COSSAC staff needed to be different from a typical planning effort.[17] The application of this sort of critical and creative thinking enabled the staff to view the problem more holistically and actively seek out opportunities to learn from ongoing operations. For example, Morgan viewed the execution of the 1943 deception operations (Operation Cockade) as "a reasonably realistic rehearsal in the course of which we would be able to overhaul the procedures that we would need to use for the great campaign."[18] The detached perspective of the staff enabled a broader approach than could have been achieved by a staff accountable to both a commander and to assigned forces.

Focus on broad concepts that enable detailed planning. Field Manual 5-0 describes our operational process as the integration "of two separate, but closely related components: a conceptual component [Design] and a detailed component [the Military Decision Making Process]."[19] The

(U.S. Coast Guard)

Landing ships putting cargo ashore on Omaha Beach at low tide, mid-June, 1944.

COSSAC staff grasped this distinction intuitively, seeing detailed planning as the responsibility of the land, sea, and air elements executing the actual operations.[20] This led them to focus their efforts on devising ways to facilitate future learning. Constantly returning to the analysis of previous efforts, the staff sought to identify things they needed to learn about, and establish a learning environment. This included sending team members "to look over the preparations for Operation Husky to learn therefrom what would be of use to us."[21] It also included making a full analysis of historical examples, including every military crossing of the English Channel from the 11th century to the 1942 raid on the port of Dieppe. These efforts reinforced the notion of learning through action by using experimental modeling to solve facets of the problem, and they spun-off numerous prototypes, including the Mulberry artificial harbors, a petroleum pipeline across the Channel, the amphibious vehicle (DUKW), and the Bailey bridge.[22]

One primary way in which the COSSAC staff maintained its focus on a broad (versus detailed) approach was by limiting the scope of its activities to things it could control.[23] Two examples demonstrate how COSSAC applied this technique—the initially singular focus on the channel crossing and the deliberate delay in analyzing alternate invasion directives.

The original Combined Chiefs of Staff planning directive, issued in March of 1943, tasked the COSSAC staff to prepare three separate plans—Cockade (deception operations), Rankin (unforeseen German surrender), and Overlord (channel crossing). However, after preparing the first overview of the plans in May 1943, General Morgan convinced the Combined Chiefs of Staff to reduce the scope of the staff's efforts to the advanced guard mission of crossing the channel—Operation Overlord. As Morgan noted, "This supplementary directive gave us a more tangible object," leading to a better refined, more focused effort.[24] Later (following the Quadrant conference in August 1943), the COSSAC staff was given a new, additional, planning requirement: examination of an invasion of Europe through Norway (Operation Jupiter). Fortunately, the COSSAC team ignored this task, the need for which rapidly became nonexistent. Morgan,

(United Kingdom Government)

British M10 tank destroyers using a Bailey bridge to cross a canal near Lille St. Hubert, Belgium, September 1944.

confronting the Combined Chiefs of Staff, again made this deliberate scaling of effort possible. He argued that "if justice were to be done to a plan for Operation Jupiter, less than justice would be available to Operation Overlord."[25] In both cases, the staff purposefully limited the scope of the problem to achieve a more refined effort on its most important parts.

Employment of subject-matter experts. Lieutenant General Morgan used the structure of the COSSAC staff to facilitate learning by combining officers of the British and U.S. Navies, Armies, and Air Forces in a fully integrated, joint staff.[26] The new design doctrine explicitly outlines leveraging "subject matter experts while formulating their own understanding."[27] Initially structured under a British model with three directorates (intelligence, operations, and logistics), every element of the staff was fully integrated with both British and American officers from every service. The inclusion of subject matter experts to supplement the military staff was extensive. As General Morgan pointed out, "Ambassadors, microfilm operators, bankers, agriculturists, newspapermen, lawyers, foresters, and a host of others, each the master of some technique [were] needed to help get us where

we wanted to go." In addition to subject matter expert integration, the COSSAC staff was "in daily contact with the headquarters of the European Theater of Operations, United States Army . . . specially so with its Services of Supply organization." As the size and scope of the COSSAC staff's efforts grew, the inclusion of experts in all of the various directorates and subordinate sections was logical and inevitable. However, the experts most critical to the success of the effort were the high-level diplomats with the broadest understanding of the overall situation who only interacted with the core members of the design effort, but "added immeasurably to the general effectiveness of the whole organization."[28] The inclusion of experts also facilitated the development of the COSSAC team as a learning organization.

Setting conditions for continuous learning. From its formation until it handed its plan over to General Eisenhower, the prime directive of COSSAC was to self-structure to maximize learning through action. As one of the "central tenets," continuous learning is a requisite part of the Army Design Methodology.[29] The COSSAC staff facilitated learning by framing and re-framing the problem set of moving over 1 million soldiers across the Atlantic and the English Channel onto the European continent. Although much of the analytic effort resulted in finite, definitive planning information, the COSSAC staff strove to build a conceptual framework that future subordinate staffs could build upon. This reflected their general understanding that the eventual goal of their effort should be a broad approach that would set the conditions for a subordinate land component commander.

Another way in which the COSSAC team approached learning through action was the use of models or prototypes, expressly created for testing and refinement. Within a military campaign, rapid prototyping can take many forms, including wargaming, narratives, system diagrams, or pilot programs. Prototyping supports learning by enabling dialogue through interaction with the physical manifestation of an idea. It relieves the tensions between the need to act and the need to think by speeding up learning. As the operations staff of the 1st United States Army observed after World War II, "However perfect and carefully devised a plan of operations may be, there are always adjustments to be made . . . it is far better to discover them and to eliminate them during a practice period than to wait and let them come to light during important action when it will be too late to make corrections."[30] The COSSAC staff sought to use initial iterations as learning events to inform future design and planning. For example, the detailed work on Operation Cockade became a prototype for future deception operations and a learning tool for the overall design effort.[31] The staff also viewed the 1942 raid operation at Dieppe, France, as a prototype. As General Morgan noted, "there were . . . many invaluable by-products of this raid which stood us at COSSAC in very good stead."[32] The use of prototypes and models enhanced the COSSAC staff's ability to continually frame, test, and re-frame their problem set.

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Iterative framing. Over the course of 1943, the COSSAC staff employed a cyclic process of problem refinement. FM 5-0 emphasizes the importance of employing an iterative framing methodology "to develop understanding of the operational environment; make sense of complex, ill-structured problems; and develop approaches to solving them."[33] Engaging in no less than six distinct iterations to refine the plan for Operation Overlord, the COSSAC staff started with a thorough review of the work completed by previous planning efforts and then framed and re-framed the problem, questioning every assumption and planning limitation from the mission assigned to the minimum required forces for a successful operation.[34] By so doing, the staff realized the need to expand the amphibious landing area to facilitate the capture of more than one port. Another significant refinement came during the fourth iteration, when a "supplementary directive" reduced the scope of COSSAC's efforts to the advanced guard mission of crossing the channel. This gave the COSSAC staff "a more tangible object, namely,

to secure a lodgment on the Continent from which further offensive operations could be carried out."[35] Also notable was the fifth iteration, an operational test of the design at the British Staff College in Largs, Scotland.[36]

The COSSAC staff applied the same iterative learning process to the development of Operation Rankin, the response of the Allies to an unforeseen surrender or disintegration of Germany. The detailed work done to outline the three separate operation plans served as models for initial framing of post-hostility planning as "the unconditional surrender of Germany, represented in actuality the culmination of Operation Overlord." As Lieutenant General Morgan observed, "although Operation Rankin never took place, it provided COSSAC with a great amount of invaluable experience and information that was indispensible to other activities."[37]

Conclusion

The purpose of the Army Design Methodology is to "organize the activities of battle command" by developing adaptive and learning organizations that are masters of integrated planning through the "operations process"—planning, preparation, execution, and assessment.[38]

Until the U.S. Army can refine the Army Design Methodology within the crucible of operational testing, historical case studies can provide a way to put this methodology in perspective.

The example provided by Morgan and the COSSAC staff has particular significance to today's Joint force. Throughout its nine-month existence, the COSSAC staff focused on learning through action, employed experts, utilized iterative framing and re-framing, and integrated conceptual approaches with detailed solutions. These actions distinguish the efforts of the COSSAC team as a design approach.

NOTES

1. This article is based on John J. Marr, "Learning Over Time: Using Rapid Prototyping, Generative Analysis, Experts, and the Reduction of Scope to Operationalize Design," monograph (Advanced Operational Art Studies Fellowship, AY 09/10).

2. Stefan J. Banach, "Educating by Design: Preparing Leaders for a Complex World," *Military Review* (March-April 2009): 96.

3. John L. Romjue, *From Active Defense to AirLand Battle: The Development of Army Doctrine 1973-1982* (Fort Monroe: U.S. Army Training and Doctrine Command, 1984), 13.

4. Ibid., 29.

5. Ibid., 30.

6. Edward C. Cardon and Steve Leonard, "Unleashing Design: Planning and the Art of Battle Command," *Military Review* (March-April 2010): 3.

7. Frederick Morgan, *Overture to Overlord* (Garden City, NY: Doubleday and Company, Inc. 1950), 129.

8. United States Forces—European Theater, "Report of the General Board: Strategy of the Campaign in Western Europe, 1944-1945 (General Board Study Number 1)" (Washington DC: Headquarters, Department of the Army, circa 1946), 10.

9. Ray S. Cline, *Washington Command Post: The Operations Division. U.S. Army in World War II Series (The War Department) (*Washington DC: Department of the Army, 1951), 156-59. The planning efforts that eventually became Operation Overlord originated under U.S. Army Chief of Staff, General Marshall (and then Brigadier General Eisenhower) in the War Plans Division of the Army staff. This initial "outline of operations" advocated a three-phased plan for an amphibious assault in April of 1943 and built a series of assumptions that shaped COSSAC's iterations of the design of Operation Overlord. These efforts were "designed to govern deployment and operations" within a strategic framework that envisioned the British Isles as a forward marshalling and training area.

10. Field Manual (FM) 5-0, *The Operations Process (*Washington DC: Government Printing Office [GPO], March 2010), 3-1, and FM 3-24, *Counterinsurgency* (Washington DC, GPO, December 2006), 4-1.

11. Banach, 96, and FM 5-0, 3-5 to 3-6.

12. FM 5-0, 3-7 to 3-12.

13. Francis Trevelyan Miller, *History of World War II* (Philadelphia: John C. Winston Company, 1945), 726, and Cesare Salmaggi and Alfredo Pallavisini, *2194 Days of War (*New York: Windward, 1977), 529-32.

14. Supreme Headquarters Allied Expeditionary Force (SHAEF), *History of COSSAC*, File 8-3.6A CA. Washington: Chief of Military History, 3 and 5.

15. Morgan, vi, and Cossac Paper.

16. FM 5-0, 3-5.

17. United States Forces—European Theater, "Report of the General Board: Study of the Organization of the European Theater of Operations (General Board Study Number 2)," (Washington DC: Headquarters, Department of the Army, circa 1946), 11.

18. Morgan, 84. See also SHAEF, 18.

19. FM 5-0, 3-1.

20. Morgan, 151. The COSSAC team recognized from the outset that their efforts were "a means to an end . . . The assault would be the affair of the advanced-guard commander to whom in due course would pass the responsibility for detailed planning (151)."

21. SHAEF, 7, and Morgan, 68.

22. Morgan, 132. For a detailed explanation of the idea genesis and subsequent development of these inventions see Morgan, 263-74. The designation of DUKW is not an acronym—the name comes from the model naming terminology used by GMC.

23. Morgan, 131. Morgan and the COSSAC team recognized that defeat of the enemy's reserves was the key to the overall campaign; however, getting there was the initial focus: "The climax of the campaign will be the defeat in battle of the main body of the enemy's reserves. This will definitely not take place on or near the beaches. . . . we must never lose sight of the fact that the assault on the beaches is merely a first step to what must follow."

24. SHAEF, 3 and 5, and Morgan, 66.

25. Morgan, 241.

26. SHAEF, 3-4.

27. FM 5-0, 3-1.

28. Morgan, 44, 64, and 217.

29. FM 5-0, 3-1.

30. First United States Army, "Unapproved G-3 After Action Review, Submitted to First U.S. Army Chief of Staff (General William Kean)," from "Summary of Operations, October 1943-July 1944, parts 1 and 2. Accessed from the official records of the Headquarters, First United States Army, 1943-1955, contained within the national archives at the President Eisenhower Library, section 1, page 12.

31. Morgan, 83. Morgan noted, "It was evident that we must make what virtue we could of necessity and that while fulfilling the terms of our directive we must be at pains to derive from our rehearsal operations such benefit as we could for our main purpose."

32. Morgan, 84.

33. FM 5-0, 3-2.

34. Cline, Washington Command Post, 159.

35. Morgan, 66. See also pages 55 and 135.

36. Morgan, 144.

37. Morgan, 118 and 123.

38. FM 5-0, 3-1 and 1-9.