

Operations Mercury and Husky: Contemporary Art of Operations and their Relevance for Operational Art

A Monograph

by

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14. ABSTRACT According to current United States (US) Army doctrine, operational art fulfills a bridging role between strategic objectives and tactical action. The German Wehrmacht and the US Army applied their contemporary art of operations in the complex testbed of World War II successfully. By comparing both doctrinal frameworks, this monograph raises the initial research questions about a comparable doctrinal perception to today's sophisticated understanding. This enables the utilization of three lenses – intent, synchronization, and risk – to evaluate the application of their art of operations during Operations Mercury (1941) and Husky (1943). Although both operations were successful, they achieved their objectives at high costs and faced significant impediments. This monograph argues for a comparability of the contemporary and the current concepts of operational art. The use of the lenses revealed that both armies utilized a constrained application and rarely exploited the potential of their art of operations. The recommendations are based on these outcomes: first, the emphasis on the strategic dialogue to create a more appropriate intent and identify critical leadership requirements for the operational artist; second, the increasing tensions between synchronization and flexibility of military action.					
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Abstract

Operations Mercury and Husky: Contemporary Art of Operations and their Relevance for Operational Art, by LTC (GS) Matthias Greune, 59 pages.

According to current United States (US) Army doctrine, operational art fulfills a bridging role to pursue strategic objectives throughout the arrangement of tactical action in time, space, and purpose. The German Wehrmacht and the US Army as part of the Allies applied their contemporary art of operations in the complex testbed of World War II successfully. By comparing the doctrinal frameworks, this monograph raises the initial research questions about a comparable doctrinal perception to today's sophisticated understanding. This enables the utilization of three lenses – intent, synchronization, and risk – to evaluate the application of an art of operations during the Operations Mercury (1941) and Husky (1943). Although both operations were successful, they achieved their objectives at high costs and faced significant impediments.

This monograph argues for a comparability of the contemporary and the current concepts of operational art. The German Wehrmacht and the US Army applied similar characteristics and principles without having a cohesive doctrinal understanding. The use of the lenses revealed that both armies utilized a constrained application and rarely exploited the potential of their art of operations.

Operation Mercury was a reflection of German operational skills and their art of operations that highlights the relation to cognitive efforts and the intent. Furthermore, it emphasized the adaptability of the German Wehrmacht utilizing their leadership philosophy to adapt quickly to emerging challenges. Nevertheless, poor synchronization and less prioritized logistical and intelligence aspects had a negative influence.

Operation Husky highlighted the impediments of indecisive leadership, vague political guidance, inter- and intra-service rivalry, and an only partially filled role of an operational artist. This affected the dialogue between strategic leaders and operational actors about the cognitive effort negatively. Subsequently, ambiguous or wanting guidance resulted in a disconnected operational approach that missed multiple opportunities to exploit chances.

The recommendations are based on these outcomes: first, the emphasis on the strategic dialogue to create a more appropriate intent and identify critical leadership requirements for the operational artist; second, the increasing tensions between synchronization and flexibility of military action.

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Acronyms

ADP	Army Doctrine Publication
ADRP	Army Doctrine Reference Publication
AOC	Army Operating Concept
CCS	Combined Chiefs of Staff
FM	Field Manual
FJR	Airborne Regiment (Fallschirmjaegerregiment)
GB	Great Britain
IT	Italy
JP	Joint Publication
LLSR	Air Assault Regiment (Luftlandesturmregiment)
ULO	Unified Land Operations
US	United States

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Section I: Introduction

Historical examples are an expedient way to improve current understanding of theories and doctrine. World War II with its dramatic political circumstances offers various positive but also disastrous examples of the application of military concepts. It provides proof for the essential need of concerted strategies and tactical action. Analyzing and assessing them with theoretical lenses helps to create and improve a doctrinal understanding of contemporary and future warfare. Today's uncertain and complex environment compels us to learn as much from history as possible. Such a study might start at various points. This monograph focuses on the link between strategic objectives, defined by a political aim, and its translation into tactical actions to achieve them. Although both the strategic and tactical domains offer different aspects of a military operation, they are not isolated and have a reciprocal relation. Therefore, the bridge between them is mission critical. This constructed tie and the way it effects the accomplishment of the strategic objective by tactical action are the key interests of this monograph. According to current United States (US) Army doctrine, this point lies in the definition of the term *operational art*.¹ This theoretical concept of the US military emerged explicitly long after World War II. However, the military had to arrange its complex actions in accordance with political guidance, objectives, and in cooperation with multiple actors prior to that – and they did it successfully.

Two historical case studies, Operation Mercury (1941) and Operation Husky (1943), show how military leaders applied an art of operations, although they were not equipped with a sophisticated doctrine like today. Guided by strategic objectives, they arranged their actions in the land, air, and sea domains in time, space, and purpose. The case studies offer highly complex characteristics and incorporate joint and combined efforts. Within the testbed of World War II,

¹ Army Doctrine Publication (ADP) 3-0, Unified Land Operations (Washington: Government Printing Office, 2011), 9.

they provide a range of valuable aspects worth examining and assessing for their relevance today. Both militaries achieved their strategic objectives at high costs and faced significant impediments. Therefore, an analysis of these examples in the framework of today's doctrinal understanding is valuable.

The monograph raises the initial research question of whether a comparable framework for the German Wehrmacht (1941) and the US Army as part of the Allies (1943) existed during World War II. Demonstrating this leads to the utilization of selected criteria to evaluate what contributed to success or failure in each case study. Subsequently, it allows deriving cursory recommendations to improve the understanding and future application of *operational art*. This monograph argues for a general comparability of contemporary art of operations during World War II and the current US Army perception of *operational art*. They indicate similar characteristics that are currently part of the US Army's idea. Using more specific lenses reveals that both armies utilized a constrained application (especially Operation Mercury) and rarely exploited their operational potential (especially Operation Husky). A special emphasis first, on the strategic dialogue leading to a more appropriate *intent* and leadership requirements for the operational artist and second, an awareness of increasing tensions between *synchronization* and *flexibility* of military action might be derived as recommendations from these examples.²

This monograph uses the methodology of comparing case studies and contrasting them with the current idea of *operational art*. This highlights not only differences but also similarities in the understanding of operational thoughts. The theoretical framework, derived from doctrinal definitions and appropriate connections to *operational art* linked to the US Army warfighting

² The operational artist is perceived as the military leader interacting with the strategic domain and translating the political guidance into an operational approach. Equipped with the appropriate level of authority and duty, he is the responsible operational military leader. See for a discussion about a definition of "operation artist" G. Stephen Lauer, "The Dao (the way) of Doctrine: Contesting an Art of Operations" (Unpublished manuscript, School of Advanced Military Studies, Fort Leavenworth, KS, June 5, 2015), 5.

concept of *Unified Land Operations (ULO)*, scrutinizes this comparison. Terms, inherent to this doctrinal concept, are depicted *in italics* to underline the relation. Besides the current definition, the monograph highlights the cursory German's and the US Army's doctrinal frames to demonstrate the equivalence of their frameworks. A key element of the methodology is the comparison of the German Wehrmacht's and the US Army's application of their contemporary *operational art*. This allows deriving parallels, emphasizes the emergence of principles, and explains critical operational weaknesses. To facilitate a qualitative assessment concerning the research questions, three lenses serve as criteria.

The first lens, *intent*, is a critical and cognitive precondition for planning and executing military activities. It should create *unity of effort* and allow focusing on key tasks. The second lens, *synchronization*, incorporates efforts to *arrange* tactical action along multiple *lines of operations* in time, space, and purpose to achieve strategic objectives. The third lens considers the perception and management of *risk* and the effect on gaining or losing opportunities during the planning and execution. The following brief literature review highlights key sources.

A twofold approach is the basis for the monograph: first, the doctrinal frameworks and second, the narrative of the case studies. Concerning the former, each timeframe offers manuals as primary resources. As guiding context for the understanding and the comparison, Army Doctrine Publication (ADP) 3-0 and the subordinate Army Doctrine Reference Publication (ADRP) 3-0 provide the current description of *operational art*. The US Army defines it as “the pursuit of strategic objectives, in whole or in part, through the arrangement of tactical actions in time, space, and purpose.”³ Elements further illustrate the definition and the application of

³ Army Doctrine Reference Publication (ADRP) 3-0, *Unified Land Operations* (Washington: Government Printing Office, 2012), 4-1.

operational art.⁴ The following consideration reframes the doctrinal perspective and facilitates the understanding in this monograph.

Thomas Bruscino distinguishes between two essential components: a “cognitive linking of strategy and tactics” and the “planning and execution” of activities.⁵ The first component especially contains more than only stating the objective: It requests the military leader to realize the strategic context behind it and encourages a reciprocal dialogue between strategy, operation, and tactics.⁶ Although their manuals contained most of these elements, the doctrinal base of the German Wehrmacht and US Army during World War II lacked a coherent concept.⁷

Secondary literature provides evidence for the comparability between the different operational thoughts. Here, Robert Citino and Gerhard Gross provide several characteristics that dominated the German approach. Both emphasize the advantageous application of *Auftragstaktik* (mission order) with its connected principles as an agile and adaptive leading procedure.

⁴ Ibid., 4-1-4-9. The ADRP lists end state and conditions, center of gravity, decisive points, lines of operations and lines of effort, operational reach, basing, tempo, phasing and transitions, culmination, and risk as elements of *operational art*. See Joint Publication (JP) 5-0, *Joint Operation Planning* (Washington: Governmental Printing Office, August 2011), III-18-III-38 with elements of *operational design* for the use in a joint environment are interconnected to the former: termination, military end state, objective, effects, center of gravity, decisive point, lines of operations and lines of effort, direct and indirect approach, anticipation, operational reach, culmination, arranging operations, and force and functions.

⁵ Thomas Bruscino, “The Theory of Operational Art and Unified Land Operations,” (School of Advanced Military Studies Theoretical Paper, Fort Leavenworth, KS, summer 2012), 3.

⁶ Ibid., 6; Hew Strachan, “A Clausewitz for Every Season,” *American Interest* 2 (2007): 33 also emphasizes this reciprocal dialogue to create and continuously refine strategy, objectives, and the tactical approach to achieve them.

⁷ For the German Wehrmacht, Condell and Zabecki comment on the German Army Manual for Unit Command in World War II (1933) in Bruce Condell and David T. Zabecki, *On the German Art of War: Truppenführung; German Army Manual for Unit Command in World War II* (Mechanicsburg: Stackpole Books, 2009). For the US Army background of 1943, the primary sources are Field Manual (FM) 100-5, *Operations* (Washington: Government Printing Office, 1941) and Field Manual (FM) 101-5, *Staff Officers’ Field Manual: The Staff and Combat Orders* (Washington: Government Printing Office, 1940).

Furthermore, they confirm recurring fundamentals of a quick, mobile, decisive, and exploiting use of the offense as the German way of warfare to defeat adversary forces.⁸ The US Army doctrine during World War II highlighted more “mastering [of] a mechanical set of competencies” to succeed.⁹ Additional secondary literature on the application of doctrine expands on the evolution due to warfighting experiences. Besides others, Walter Kretchik, Michael Matheny, and Antulio Echevarria provide an appropriate frame of references.¹⁰ They argue that doctrine lacked a cohesive operational thought, but confirm the incorporation of the depicted principles.

The second aspect of the literature review focuses on the case studies. US governmental analyses have created a broad understanding of the contemporary military situation and the outcome.¹¹ Additional empirical sources incorporate views that are more recent. For Operation Mercury, Heinz Richter and Tim Saunders offer a broad description.¹² Carlo D’Este and Albert

⁸ See Gerhard P. Gross, *Mythos und Wirklichkeit: Geschichte des operative Denkens im deutschen Heer von Moltke d.Ae. bis Heusinger* (Paderborn, Germany: Ferdinand Schoeningh, 2012), 199-240; Robert M. Citino, *The German Way of War: From the Thirty Year’s War to the Third Reich* (Lawrence: University of Kansas Press, 2005), 243-254.

⁹ Peter J. Schifferle, *America’s School for War: Fort Leavenworth, Officer Education and Victory in World War II* (Lawrence: University of Kansas, 2010), 63.

¹⁰ For American operational doctrinal analysis see: Walter Kretchik, *U.S. Army Doctrine: From the American Revolution to the War on Terror* (Lawrence: University of Kansas, 2011), 107-157; Antulio J. Echevarria, “American Operational Art: 1917-2008,” in *The Evolution of Operational Art: From Napoleon to the Present*, ed. John Andreas Olson and Martin van Creveld (Oxford: Oxford University Press, 2011), 144-150; Robert M. Citino, *Blitzkrieg to Desert Storm: The Evolution of Operational Warfare* (Lawrence: University of Kansas Press, 2004), 75-115; Michael R. Matheny, *Carrying the War to the Enemy: American Operational Art to 1945* (Norman: University of Oklahoma Press, 2011), 160-201.

¹¹ US Military Academy, *Operations in Sicily and Italy* (West Point: Department of Military Art and Engineering, 1947), 1-23; US War Department, *Air-Borne Invasion of Crete* (Washington: Military Intelligence Division, 1941), 1-20.

¹² Heinz A. Richter, *Operation MERKUR: Die Eroberung der Insel Kreta im Mai 1941* (Ruhpolding, Germany: Verlag Franz Philipp Rutzen, 2011), 16-291; Tim Saunders, *Crete: The Airborne Invasion 1941* (South Yorkshire, United Kingdom: Pen & Sword Military, 2008), 9-

Garland present comprehensive information and add a critical judgment of Operation Husky. According to their assessment, several failures led to a “bitter victory.”¹³ Furthermore, articles and monograph studies link both examples up to *operational art*.¹⁴ Reflective considerations and biographies about key actors complement the literature.¹⁵ Since the delineated literature about operational thoughts offers many theoretical considerations, the review reveals that a lot of work has been spent on the theoretical framework and the descriptive part of the case studies. The comparison of frameworks or the contrasting of different case studies with the current understanding of *operational art* has received less emphasis – that is where this study intends to add some value.

The monograph consists of four parts. Section I outlined the guiding questions and delineated the scope of the sources. Picking up a broad framework, section II summarizes the manual synopsis and introduces the understanding of the lenses as criteria. They appear in application in the case studies, as section III.1 and section III.2. After presenting the strategic setting and the adversaries briefly, this section applies the defined lenses to examine the planning and execution phases. Derived from that, section IV summarizes the comparisons by highlighting

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¹³ Carlo D’Estes, *Bitter Victory: The Battle for Sicily 1943* (New York: Dutton, 1988), 21; Albert N. Garland and Howard McGaw Smyth, *United States Army in World War II: The Mediterranean Theater of Operations, Sicily and the Surrender of Italy* (Washington: Government Printing Office, 1965), 23.

¹⁴ Examples of these topics in articles and monographs are, for example Maria A. Biank, “The Battle of Crete: Hitler’s Airborne Gamble” (Master Theses, Command and General Staff College Fort Leavenworth, 2003), 20-75 and 87-89; Stephan R. Cote, “OPERATION Husky: A critical Analysis” (Research Paper, Naval War College Newport, 2001), 2-17; Kenneth J. Cox, “The Battle of Crete (Operation Mercury): An Operational Analysis” (Research Paper, Naval War College Newport, 2001), 1-26; John C. Lemay, “Operation Husky: Operational Art in Large Formation Combined Arms Maneuver” (Monograph, School of Advanced Military Studies Fort Leavenworth, 2013), 19-44.

¹⁵ As examples Martin Blumenson, *Patton: The Man Behind the Legend* (New York: William Morrow and Company, 1985), 173-207; Carlo D’Este, *Eisenhower: A Soldier’s Life* (New York: Henry Holt and Company, 2002), 406-442.

emerging aspects, providing recommendations, and concluding with an outline for future research. Having introduced the scope of this monograph, section II elaborates on the different frameworks.

Section II: Doctrinal Synopsis and General Application of Operational Art

This comparison provides the answers to the initial question of the monograph: did comparable concepts of *operational art* exist, which tenets characterized the applications, and what kind of differences were on hand? This section introduces the current understanding of *operational art* as defined by US Army doctrine, and presents the contemporary understanding of an art of operations of the German Wehrmacht and the US Army during World War II. The monograph deliberately avoids presenting evolutionary steps. It focuses on identifying and defining common lenses that are applicable as criteria in section III. The following most recent explanation provides the doctrinal frame.

Current US Army Operational Art

The US Army operational concept of *Unified Land Operations* envisions today's warfighting to attain a position of relative advantage. To achieve an objective ("end") provided by a strategic guidance, *ULO* applies "ways" and incorporates "risks" to utilize the Army as military "means." Several tenets characterize the application. Among these, *synchronization* aims at a purposeful arrangement of multiple efforts in time, space, and effects within a concept. To best orchestrate them, appropriate means and a common understanding of task and purpose ("*intent*") are essential. Following the idea of unified action, *integration* of national and multinational actors into a unified operational framework is complementary to *synchronization*.

Besides other aspects, *ULO* contains two inevitably interwoven components to develop and apply “ways”: *operational art* and *mission command*.¹⁶

The former contains the US Army’s cognitive method to arrange and *synchronize* military activities to achieve strategic objectives. Following the subdivision into two components underlined by Bruscino, this approach covers more than a linear, independent arrangement of tactical action. The strategic context needs to be taken into account. It highlights Carl von Clausewitz’s assessment of the relationship between art and science.¹⁷ To find appropriate “ways,” *elements of operational art* (US Army) or *operational design* (joint doctrine) support the commander to analyze the operational environment and purposefully *synchronize*.¹⁸ These elements are complementary to the tenets of *ULO*. Among them is *risk*, omnipresent in military action. According to ADRP 3-0, it “creates opportunities” to act decisively, but also requires willingness and mitigation measures.¹⁹ Additionally, *risk* is interwoven with *mission command*, which leads us to the second foundation of *ULO*.

Mission command creates a command philosophy that supports the accomplishment of military tasks in today’s uncertain, unknowable, and quickly changing environment. Based on six principles, the monograph elaborates on the elements of *prudent risk* and the *commander’s*

¹⁶ ADP 3-0, 7-9. Besides *synchronization*, the tenets of *flexibility*, *integration*, *lethality*, *adaptability*, and *depth* are highlighted.

¹⁷ Bruscino, “The Theory of Operational Art and Unified Land Operations,” 3 and 6, emphasizes a *cognitive linking of strategy and tactics* and the *planning and execution of military activities*; Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1989), 148-151; ADRP 3-0, 4-1. In relation to JP 5-0, III-1, this definition clearly states to pursue rather than develop these strategies and objectives.

¹⁸ See ADP 3-0, 2 and 9-10. The operational environment is defined as “conditions, circumstances, and influences that affect the employment of capabilities and bear on decisions.” For joint doctrine see JP 5-0, III-1-III-5.

¹⁹ ADRP 3-0, 4-1 and 4-9.

intent.²⁰ According to the twofold perception of *risk* as an element of *operational art* and a principle of *mission command*, it is the “deliberate exposure” to it, demanding judgment in an assessment of whether it is “worth the cost” to create opportunities and act decisively.²¹ Therefore, the operational artist balances opportunities and *risks* during the planning and execution of action. Another crucial principle of *mission command* is the creation of *shared understanding* to allow a clear *commander’s intent* to emerge and guide operations. Their inextricable relationship empowers subordinates to act and adapt purposefully in ambiguous conditions. Without restricting the freedom of action of subordinates disproportionately, it provides guidance, limits, and unifies action towards a common objective.

This depicted synopsis of current US Army doctrine highlights the complementary relationship between *operational art* and *mission command* as foundational to *ULO*. In addition, several elements and principles allow characterizing the application. Within this concept, a *commander’s intent*, *synchronization*, and *risk* represent valuable criteria for an assessment of historical case studies. The next part sketches the understandings during World War II.

German Wehrmacht’s Art of Operation

The German Wehrmacht perceived the successful conduct of war as an art complemented by science elements that resonate with Bruscano’s two components.²² Rooted in the traumatic experiences in World War I and intensive examinations during the interwar period, the German’s thinking followed traditional pillars provided by those such as Clausewitz, Helmuth Moltke the

²⁰ Army Doctrine Publication 6-0, *Mission Command* (Washington: Government Printing Office, 2015), 1-5. The six principles are: *mutual trust*, *shared understanding*, *commander’s intent*, *disciplined initiative*, *mission orders*, *prudent risk*.

²¹ *Ibid.*, 5.

²² Gross, *Mythos und Wirklichkeit*, 172.

Elder, or Hans von Seeckt.²³ Besides other manuals, applicable thoughts are best depicted in *Heeresdienstvorschrift 300, Truppenfuehrung* (German Army Regulation 300, Troop Leading) which "stands firmly in the tradition of the German way of war."²⁴ Williamson Murray assesses this as "the most influential doctrine" and "the most thoughtful examinations of the conduct of operations and leadership ever written."²⁵ Like the previously mentioned US Army understanding, it focused on an orchestration of military forces and resources in an operational environment with time and space as continuous variables. Necessary guidance for these actions included higher headquarters' *intent* and their approach to achieve a given objective. This German art of operations consisted of several elements of which three essential pillars deserve a closer examination for the purpose of this monograph.

First, the *operational framework* marked supporting and main efforts (*Schwerpunkt*) of military action. Concentrating forces and resources at a *decisive point* accomplished this effort.²⁶ This allowed attaining a task quickly and decisively within cohesive operations of combined arms maneuver: defeat of the adversary by annihilation.²⁷ Centralized planning facilitated *synchronization* of different services and tasks to provide an *intent* and *shared understanding* for the decentralized execution. The main effort implies the deliberate acceptance of *risk*.

²³ Karl-Heinz Frieser, *Blitzkrieg-Legende: Der Westfeldzug 1940* (Muenchen, Germany: Oldenbourg Verlag, 2012), 9.

²⁴ Condell and Zabecki, *On the German Art of War*, x; Robert M. Citino, *The Path to Blitzkrieg: Doctrine and Training in the German Army, 1920-1939* (Boulder: Lynne Rienner Publishers, 1999), 223-229.

²⁵ Williamson Murray, "Leading the Troops: A German Manual of 1933," *Marine Corps Gazette* 83 (September 1999): 95.

²⁶ Robert M. Citino, *Blitzkrieg to Desert Storm*, 8; Condell and Zabecki, *On the German Art of War*, 88-92.

²⁷ Citino, *The German Way of War*, 253-254; Frieser, *Blitzkrieg-Legende*, 415-416.

Directly related to that is the second pillar: Blitzkrieg, a synonym for a highly mobile form of combined arms mechanized maneuver. This concept summarized critical tenets and emerged out of contemporary German operational thoughts.²⁸ In conjunction with a main effort and a *synchronized* concept, a quick, decisive, and mobile conduct of military action should achieve victory. Additionally, *surprise* would enhance this concept and even allow incorporating a higher degree of *risk* to create opportunities and avoid protracted warfare. The Blitzkrieg concept followed a broad and iterative approach of “penetration – breakthrough/envelopment – pursuit – exploitation” and was applicable in a *synchronized* mixture of domains.²⁹

The third pillar enhanced the application of the previous concept and created an essential precondition. The command philosophy of the German Wehrmacht, called *Auftragstaktik*, facilitated independent thinking, adaptability, and responsibility as essential factors. The concept as applied during the *planning and executing* of operations was not bound to a certain echelon. A crucial idea, *Auftragstaktik* empowered subordinates to fulfill a given task by providing only “what” (task) and “why” (*intent*) to do but not “how” (e.g. methods, detailed directives) to accomplish it.³⁰ Preconditions for a successful application in an ambiguous environment were an above-average *acceptance of risk*, a *trusted* relationship that allows decentralized responsibility, and an appropriate education of the subordinate. The *intent*, providing task and purpose, was the

²⁸ Frieser, *Blitzkrieg-Legende*, 9, 412-432, who characterizes Blitzkrieg as operational warfare of movement and summarizes several tenets; Gross, *Mythos und Wirklichkeit*, 201. In addition, Citino, *The Path to Blitzkrieg*, 223, who links the Blitzkrieg concept especially to combined arms operations. In contrast to Frieser’s synonymous definition of Blitzkrieg as an operational warfighting concept, Naveh counters that this was actually a lack of operational cognizance and reduces German operational thought to a merely tactical approach and understanding; Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (Oxon, Great Britain: Cummings Center, 2006), 121-150.

²⁹ Gross, *Mythos und Wirklichkeit*, 213, with domains such as land, air, naval, amphibious, and air borne.

³⁰ Frieser, *Blitzkrieg-Legende*, 421.

glue that guided and *synchronized* military efforts during an execution. It reduced the demand of micromanaged command and control and enabled quick adaptations. These central patterns facilitated the admitted freedom of action.³¹ The following paragraphs incorporate operational thoughts prior and during World War II.

Common to the doctrinal application is the strategic geographical dilemma of Germany and its constant inferiority of military means respective to resources. Consequently, *risk* was an inevitable circumstance. It was the *zugzwang* – the inevitable necessity avoiding defeat – to achieve success and avoid hesitation or protraction. This marked an ideal precondition for the *Bewegungskrieg* (combined arms mechanized maneuver) principles.³² The General Staff was the dominant means to apply operational thoughts and facilitated the art and science in it. However, the German military, especially during their quick enlargement during the late 1930s, did not make doctrine inviolable or authoritative in the US Army doctrinal sense. They perceived it as an adaptive toolbox with general guidance. *Auftragstaktik* further encouraged this habit.³³

Within the German utilization of thoughts, an identifiable tactical-operational and a strategic-operational diversion emerged. The depicted thoughts highlighted more tactical actions than an overarching strategic design. Furthermore, aspects of logistics and intelligence received less emphasis and affected the degree of *risk*; Operation Mercury expands on this aspect.

³¹ Condel and Zabecki, *On the German Art of War*, 23-24; Joerg Muth, *Command Culture: Officer Education in the U.S. Army and the German Armed Forces, 1941-1940, and the Consequences for World War II* (Denton: University of North Texas Press, 2011), 183.

³² Gross, *Mythos und Wirklichkeit*, 321; Martin van Creveld, *Fighting Power: German Military Performance, 1914-1945* (Potomac: C&L Associates, 1980), 32.

³³ Gross, *Mythos und Wirklichkeit*, 84 and 209, describes it even as tension between a traditional and a progressive understanding of doctrine. Condel and Zabecki, *On the German Art of War*, 282, incorporate the assessment of former German World War II generals who highlighted general principles for the successful application of operational thoughts and command.

Combined with Adolf Hitler's increasing interventions down to the tactical level in the once purely military domain, this fragmentation allowed the intended flexibility and initiative to deteriorate. Increasingly excluding the advice of military planners in the formulation of strategic aims, Hitler incrementally introduced a warped cooperation between strategic and operational thinking.³⁴ His constraints and denial accelerated the General Staff's decline as means to facilitate an art of operations. This diminished *Auftragstaktik* as a facilitator as the war progressed.³⁵

The previous part about the underlined doctrinal pillars of German art of operations and its highlighted tenets revealed basic similarities to recent US Army manuals. All three lenses are part of the operational thought of both armies. However, the understanding of *risk* contains a qualitative difference to the US Army perception. After this description, an examination of US Army understanding of an art of operations during that timeframe follows.

US Army's Art of Operation

During World War II, US Army's art of operations was influenced by the impressions of German and Japanese warfighting and incorporated initial experiences of its own major operations. Doctrine did not contain an explicitly highlighted operational thought. However, manuals like the Field Manual (FM) 100-5 Operations (1941) or FM 100-15 Larger Units (1942) were the first to encompass those elements that characterize *operational art* today. They dominated how the US Army arranged military action along different variables to achieve an

³⁴ Gross, *Mythos und Wirklichkeit*, 246; Trevor N. Dupuy, *Der Genius des Krieges: Das deutsche Heer und der Generalstab 1807 – 1945* (Graz, Austria: Ares Verlag, 2009), 378. Both authors emphasize Hitler's interference, his general dislike of the General Staff, and especially his command approach against best military advice as reasons for the diminishing coherent connection.

³⁵ Matheny, *Carrying the War to the Enemy*, 200-205; Jehuda L. Wallach, *The Dogma of the Battle of Annihilation: The Theories of Clausewitz and Schlieffen and their Impact on the German Conduct of Two World Wars* (Westport: Greenwood Press, 1986), 300-309; Gross, *Mythos und Wirklichkeit*, 215-217.

objective. Out of many, the prevailing principles of an *offensive spirit* were *decisiveness*, *synchronization*, a cohesive *operational framework* including a main attack, and especially logistical aspects like *operational reach*. The application envisioned large-scale combined arms operations with the concentration of mobile forces. Superiority and coordination of firepower enabled movement and success. Following Echevarria's distinction, this concept focused on "first grammar" action to defeat the enemy by attrition or annihilation.³⁶ The understanding of *risk* was generated from a perception of overwhelming forces and material. Therefore, the acceptance allowed more calculation to take *risk* compared to the German perception. Concerning command aspects, a commander centric organization should facilitate *unity of command* and *effort*. In contrast to the German philosophy, *planning and execution* demanded more details, and was the dominant component of their art of operations compared to the *cognitive effort*. Partially a regulative and anticipatory doctrine, it attempted to directly control and facilitate synergies rather than to encourage freedom of action. Nevertheless, these manuals created a framework that served as reference for the challenges in World War II.³⁷

US Army interwar education synthesized these doctrinal elements and created a workable operational knowledge. Similarly to today's doctrinal frame, it emerged and set the stage for an institutional knowledge. Nevertheless, it was characterized by a "methodical application" than mastering the concept behind it.³⁸ After initial setbacks during the war, the theoretical framework merged to a skillful application. Especially the arrangements of *coordinating* military actions

³⁶ Echevarria, *American Operational Art*, 137. He differs between a war of conventional forces with the aim of attrition or annihilation (first grammar) and a war facing mainly oriented on insurgency or irregular warfare (second grammar).

³⁷ As reference to the depicted capstone manuals see FM 100-5 and FM 101-5. As secondary literature and assessment Matheney, *Carrying the War to the Enemy*, xvii and 88-91; Echevarria, *American Operational Art*, 137, 145-161; Kretchik, *U.S. Army Doctrine*, 148-154.

³⁸ Schifferle, *America's School for War*, 63; Echevarria, *American Operational Art*, 146.

within joint and combined efforts facilitated evolutionary improvements. Operation Husky marked one of these steps. While incorporating World War II impressions, it is not surprising that contemporary US Army manuals coincided with German Wehrmacht's *Truppenfuehrung*.³⁹ Having introduced three doctrinal frameworks, the criteria definitions finish this section.

Concluding Description of Lenses

The description of the purpose and constituting principles revealed a general comparability of all approaches, although both contemporary doctrines did not explicitly highlight it. Nevertheless, they elaborated on similar tenets, incorporated *cognitive efforts* within an *intended* and *synchronized* orchestration of military action to achieve strategic objectives. This is consistent with the core understanding of today's *operational art*.

Although Shimon Naveh perceives the German doctrine as little more than tactics on a larger scale, Gross' definition of the German operational thoughts almost matches the current explanation. Furthermore, their application generally influenced contemporary US Army doctrine of 1941 and led to a similar content. The judgment of several German Generals supports this evidence.⁴⁰ However, the scope of how *Auftragstaktik* and *risk* were utilized in the German Wehrmacht went far beyond others. To summarize, German doctrine underlined much more freedom in application, while the US Army followed a scientific and dogmatic execution of its doctrine. This contributed to an agile and adaptive German attitude towards solving frictions.⁴¹

³⁹ Condel and Zabecki, *On the German Art of War*, 280.

⁴⁰ Gross, *Mythos und Wirklichkeit*, 17: "The term fits between tactics and strategy. Operational thoughts can be perceived as reflection on certain factors like time, space, and forces in relation to the deployment and leading of larger task forces on a battlefield to achieve strategic objectives" (translated by author). See as reference ADRP 3-0, 4-1. See more critical Naveh, *In Pursuit of Military Excellence*, 112-121; Condel and Zabecki, *On the German Art of War*, 280.

⁴¹ Gross, *Mythos und Wirklichkeit*, 321; Muth, *Command Culture*, 210; Crevel, *Fighting Power*, 37-47.

Additionally, both contemporary doctrines contained many specified and implied elements of today's *operational art*. Concerning planning and execution, the *synchronization* and *integration* aspects dominated coordinating efforts. Overall, the acceptance of *risk*, facilitated by an *understanding* and an *intent*, is critical to achieve decisive success. A qualitative difference existed between the meaning and the handling of *risk* in the German and US Army's perception. Both US doctrines defined the foreknowledge and acceptance of *risk* as a conscious and deliberate action to create opportunities for decisive success, and such was both extrinsic to operations and amenable to discovery prior to execution. The German concept focused on the inextricable character of *risk* as immanent to all operations, creating an environment where initiative and adaption was an ineluctable component of successful operations, not something determined prior to the action. Their general inferior setting during the war, the dogma of a quick and decisive success, and the political situation reduced their reluctance to accept *risk* and tied this to the understanding and intent of the precept of *Auftragstaktik*. In contrast to that, the US Army aimed to act out of a relative numerical and qualitative superiority – a circumstance that has allowed a deliberate management of *risk* until today.⁴²

By framing the doctrinal background and providing sufficient evidence for comparable theoretical concepts and *elements of operational art*, section II answered the initial research question. Out of the current *ULO* concept and its inextricable components of *operations art* and *mission command*, three lenses emerge. These lenses assess the application of operational thoughts during planning and execution of the case studies. This assessment incorporates how the lenses contributed or failed to contribute to achieve the strategic objectives. The next part elaborates on the criteria and their related research questions.

⁴² Ibid., 37-39 with special emphasis on his assessment.

The first lens, *intent*, incorporates best the *cognitive component* to translate the strategic context and operationalize it for subordinate leaders. An *intent* is a critical precondition for planning and executing military activities. It frames purposes, a military end state, and conditions to allow focusing on key tasks. Coupled with *shared understanding* and *disciplined initiative*, the *intent* also sets guidance for ambiguous contingencies and supported the operational artist. It assesses how well it helped the German Wehrmacht and the Allies to purposefully develop an *operational approach* that achieved the objectives while applying *unity of effort*.

Second, the lens of *synchronization* incorporates efforts to *arrange* tactical action in time, space, and purpose to achieve strategic objectives – the core task of Brusino’s planning and execution component. It includes different *lines of operation* as well as constraints. If appropriate, other elements of *operational art* or *operational design* such as *anticipation* or *arranging operations* are linked to demonstrate the significance of this lens. The assessments of this lens reveal to what extent the German Wehrmacht and the US Army coordinated their efforts and provided some evidence for why both failed to achieve stunning victories.

The third lens emphasizes to what degree *risk* was accepted and how both armies accounted for it. It highlights which opportunities for decisive actions were gained or lost while mitigating *risk*. Having underlined a qualitative difference, the US Army accounted for it as a deliberate exposure to create opportunities while the German military perceived *risk* as an inevitable part of the *operational approach*. After setting the theoretical framework, section III describes the general application of contemporary operational doctrine by the German Wehrmacht and the US Army during World War II.

Section III: Art of Operations during the Operations Mercury and Husky

This section assesses the application of an art of operations in the case studies. Within the complex environment of World War II, operational artists were key persons of military activities. They worked at the interface of the political and the military domain and had the essential requirement to perceive the strategic context, translate it, and purposefully arrange their actions in time and space. Thus, operational artists, equipped with the appropriate level of authority, resources, and responsibility, had to decide about the employment of ways and means and to solve tensions between competing aspects.⁴³ Both examples presented a landmark of warfighting and consisted of multiple *lines of operations*, such as air, airborne, land, amphibious, and naval elements. While victorious in each case, both armies perceived the victories as flawed examples of the contemporary art of operations.

The case studies provide a strategic overview, characterize the adversary, and subsequently describe the application of a contemporary art of operations in the planning and executing phases. The defined lenses of *intent*, *synchronization*, and *risk* focus the assessment for this analysis. Section IV picks up key considerations out of both case studies.

III.1 Operation Mercury

Crete is an example of the truth that force as well as foreknowledge is needed to win.

—Ralph Bennett, *Ultra and Mediterranean Strategy*

Strategic Considerations

Since 1939, the German military had conducted absolute warfare and applied its warfighting concept of decisive and quick combined arms mechanized maneuver impressively.⁴⁴

⁴³ Lauer, “The Dao (the way) of Doctrine,” 5.

⁴⁴ For the absolute war concept see Clausewitz, *On War*, 582-584; for the success of *Bewegungskrieg* Gross, *Mythos und Wirklichkeit*, 201; Citino, *The German Way of War*, 311.

In fall of 1940, central and northern Europe was under German control, France was defeated, and Great Britain pushed to the southern periphery with an increasing threat on their critical lines of communications in the Atlantic and the Mediterranean Sea.⁴⁵ Postponing the invasion of Great Britain, Hitler turned his attention to the East to retain the initiative. He directed an attack on the Soviet Union for summer of 1941 as his new main effort. While this intention ideologically obsessed him, the military preferred to fight against Great Britain.⁴⁶

Germany's junior partner, Italy, strived for success with a poorly planned campaign and invaded the Balkans in October 1940 – a region Hitler tried to keep stable to economically exploit and preserve forces. As happened in North Africa, Germany was drawn into the fighting. The German Navy and the Luftwaffe especially perceived this as an opportunity to emphasize their relevance compared to the upcoming land dominated enterprises. In light of Operation Barbarossa and an imminent British air raid threat on critical oil fields in Romania, Hitler took the initiative. The German Wehrmacht invaded Yugoslavia and occupied Greece within weeks. Greek and Commonwealth troops used Crete as a hasty evacuation base. This presented the island as an objective of opportunity to secure the southern flank. Additionally, it offered Germany a stepping-stone for exploitation. The Luftwaffe appeared ambitious while seeking to regain credibility after the lost Battle of Britain.⁴⁷ Therefore, General Kurt Student introduced his operational airborne means to Hitler in April 1941. Hitler was receptive to General Student's audacious and unconventional approach to use the seizure of Crete as a means to secure the oilfields as an overall strategic objective. However, Hitler preferred a defensive approach

⁴⁵ Saunders, *Crete*, 9-10.

⁴⁶ Richer, *Operation Merkur*, 72, emphasizes the dissent.

⁴⁷ Martin van Creveld, *Hitler's Strategy 1940-1941: The Balkan Clue* (New York: Cambridge University Press, 1973), 166-168. At that time, the German airborne capabilities belonged to the Luftwaffe.

allowing him to refocus on the East once Crete was seized. This concept was in contrast to the military's idea.⁴⁸ Nevertheless, Operation Mercury would placate the ambitious services.⁴⁹

On 25 April, War Directive 28 put the Luftwaffe in charge, ordered the seizure of Crete as the objective, and announced potential follow-on operations in the Mediterranean Sea as the purpose. Nevertheless, constraints would heavily influence the hasty German art of operations. Hitler permitted no interference with the preparation of Operation Barbarossa. This initiated time sensitive planning since forces and material were scattered all over Europe. In doing so, the operation almost appeared incapable of action and exposed it to greater *risk*.⁵⁰

The Adversary

New Zealand's newly appointed General Bernard Freyberg had roughly 41,000 motley arrayed and partially humiliated soldiers at his disposal. They created an advantageous force ratio for the defense, a task rooted more in political reasons than in military relevance.⁵¹ Although General Freyberg had decrypted intelligence information that revealed the German lines of operations and timings, he was ambiguous about the reliability and tried to fill existing intelligence gaps.⁵² Additionally, he dealt with multiple challenges such as inadequate air defense and communication means. Limited mobility, inexperienced staff, and tangled command

⁴⁸ B. H. Liddell Hart, *The German Generals Talk: Startling revelations from Hitler's high Command* (New York: Quill, 1979), 158.

⁴⁹ Creveld, *Hitler's Strategy 1940-1941*, 168-170; Peter D. Antill, *Crete 1941: Germany's Lightning Airborne Assault* (Long Island City: Osprey Publishing, 2010), 7-13; Citino, *Blitzkrieg to Desert Storm*, 43-48.

⁵⁰ Supreme Command of the Armed Forces, "Directive Number 28: Operation Merkur" (Mission order, Berlin April 25, 1941); Blair A. Ross Jr. "The Battle of Crete and its Implications for Modern Contingency Operations" (Monograph, School of Advanced Military Studies Fort Leavenworth, 1993), 16.

⁵¹ Richter, *Operation Merkur*, 284.

⁵² Antill, *Crete 1941*, 34-35.

relationships prevented the Allies from exploiting advantages like interior lines.⁵³ Although the British Navy enjoyed superiority and deterred seaborne approaches, the Royal Air Force assets in Egypt were too remote to react in a timely manner. This limited naval resupply from North Africa to night hours only. Familiar with static and attritional World War I fighting, senior leaders did not anticipate the upcoming significance of mobility, *initiative*, and adaptability.⁵⁴

The defense along the northern coastline intended to block an amphibious assault with a main effort around Suda. Smaller formations defended key terrain, especially airfields. General Freyberg sent signals of confidence, although his forces were less combat effective. Quick and flexible adaptations of the concept, such as committing reserves, were hampered by lacking unity of command and indifferent leadership.⁵⁵ Consequently, the evolutionary form of Blitzkrieg, conducted by a vertical envelopment, inflicted an unexpected humiliation to the British Empire.⁵⁶

The Planning

Improvisation summarizes the planning of Operation Mercury. Deduced from Directive 28, the German military faced the following operational question: How was the command to consolidate forces and seize the fortified island of Crete with constricted air, airborne,

⁵³ Citino, *Blitzkrieg to Desert Storm*, 44-45, who elaborates on the nearly chaotic command relationship.

⁵⁴ For the overall consideration of the adversary, see Richter, *Operation Merkur*, 75-80, 90-104; Antill, *Crete 1941*, 7-29; Douglas Porch, *The Path to Victory: The Mediterranean Theater in World War II* (New York: Farrar, Straus and Giroux, 2004), 156-176.

⁵⁵ Richter, *Operation Merkur*, 277-278.

⁵⁶ Franz Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte: Von Leuthen bis Stalingrad* (Graz Austria: Ares Verlag, 2006), 300; John Keegan, *The Second World War* (London, Great Britain: Pimlico, 1989), 139. For the evolution of *Blitzkrieg* see Ross, *The Battle of Crete*, 34.

amphibious, land, and naval means, anticipating a disadvantageous force ratio, no later than the middle of May without impairing the preparation of Operation Barbarossa?⁵⁷

Although Hitler never intended to exploit it, the tasks and purpose formed a clear *commander's intent* that fed the staff work. This created a *shared understanding* among the planning team.⁵⁸ The military hastily applied *cognitive efforts* to achieve its goal since time was the most critical issue. Once the *intent* became operational in a conceptual plan that combined constraints and limitations, it facilitated a detailed, centralized collaboration and *integration* of air, airborne, naval, and ground expertise without major inter-service rivalries.⁵⁹ The planning utilized a straightforward command structure and installed General Alexander Loehr as operational artist, including the appropriate authorities and responsibilities. He gained overall command and established a joint planning staff in close proximity to the services in Athens. This *unity of command* allowed a relatively free hand and unfolded the potential of an *intent* successfully.

⁵⁷ Supreme Command of the Armed Forces, Directive Number 28; US Department of the Army, *The German Campaigns in the Balkans: Spring 1941* (Washington: Department of the Army, 1953), 147; Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte*, 294.

⁵⁸ Citino, *Blitzkrieg to Desert Storm*, 43.

⁵⁹ US Department of the Army, *The German Campaigns in the Balkans*, 121. Especially the Army feared to commit first class soldiers for a secondary theater and did not follow the Luftwaffe's enthusiasm. Porch, *The Path to Victory*, 167, assesses the collaboration and chain of command more in a negative way.

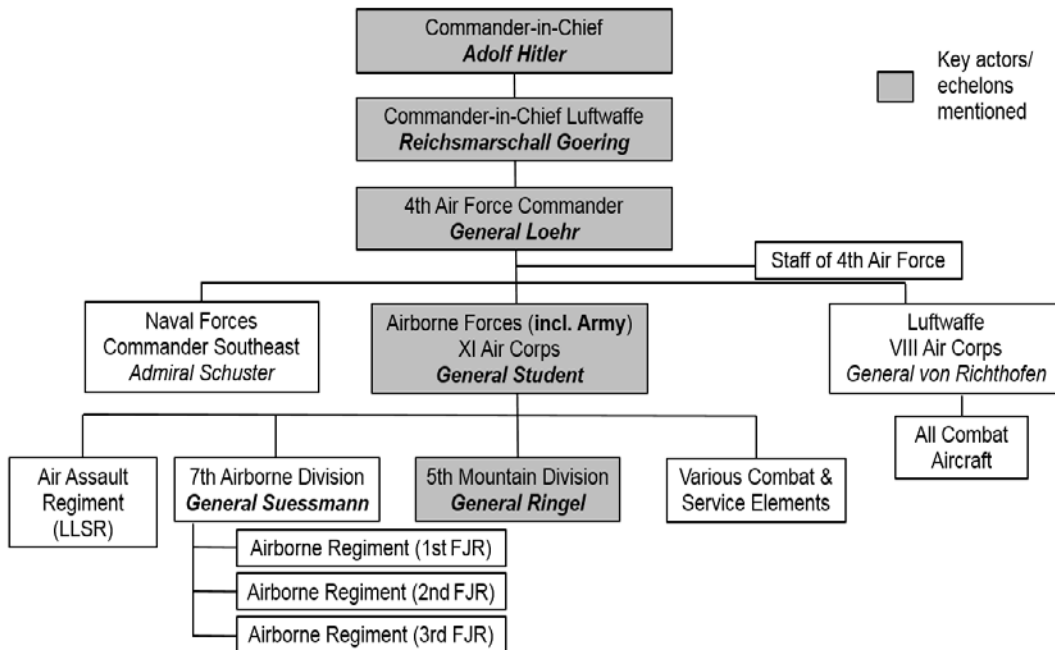


Figure 1. Chain of Command Operation Mercury

Source: Figure created by author using information from US Department of the Army, *The German Campaigns in the Balkans*, 142; Richter, *Operation Merkur*, 303.

The directive was in line with the German command philosophy *Auftragstaktik*. General Loehr, supported by General Student, translated this into an *operational approach*. His personal involvement allowed him to reevaluate his guidance and the planning constantly. It enabled the planners to apply creative and critical thinking in “how” to incorporate best constraints and shortfalls. In addition, the *intent* revealed the need to *synchronize* different tactical actions in time, space, and purpose. Also, it pointed out where and when to accept or decline *risk*.⁶⁰ Reichsmarschall Herman Goering, however, decided to merge two recommended courses of action to fulfill Hitler’s *intent*. Thus, he neither *massed* forces nor did he achieve *tactical surprise*, while neglecting a real main effort.⁶¹ Logistical constraints dominated the initial

⁶⁰ Condell and Zabecki, *On the German Art of War*, 23.

⁶¹ Citino, *Blitzkrieg to Desert Storm*, 48.

thoughts. Limited air transportation means required the Germans to divide troops and objectives into two separated waves, including a highly critical transition between them. This dramatically increased the need for detailed *synchronization*, stressed logistical considerations, and enlarged the level of *risk*.

After the Luftwaffe's shaping operations, the concept planned for 15,000 airborne soldiers to seize key terrain at Maleme/Canea (first wave) and Retimo/Heraklion (second wave, about eight hours after the first). Once accomplished, it would enable air-mechanized reinforcements. A seaborne attack of 7,000 additional soldiers around Suda would increase *mobility* and *operational reach* to seize the island. The Luftwaffe had to maintain air superiority and provide air transportation continuously. This enabled the land and naval operational concepts, provided *lethality*, and mitigated *risks*.⁶²

Even the *intent* emphasized two warfighting functions that historically received less emphasis in German operational planning: intelligence and logistics. While the first dramatically underestimated the adversary's strength and intent, the latter suffered heavily from the prioritized preparation of Operation Barbarossa.⁶³ Both considerations increased the *risks* and affected the execution disadvantageously. To summarize, the established *unity of effort* and the *intent* were the operational strength and in line with traditional German planning.⁶⁴ They facilitated the preparation and provided guidance in ambiguous contingencies to adapt – this would pay in the execution.

⁶² US Department of the Army, *The German Campaigns in the Balkans*, 126-127; Saunders, *Crete*, 44.

⁶³ Richter, *Operation Merkur*, 80-82.

⁶⁴ Citino, *Blitzkrieg to Desert Storm*, 43.

The second lens, *synchronization*, focuses on how the German Wehrmacht superficially arranged tasks and forces due to time limitations and capability constraints. Although the *intent*, the *unity of command*, and the *operational approach* set an appropriate framework, the need to *synchronize* complex military actions was mission-essential. In particular, the phases incorporated multiple *lines of operations* with changing main efforts that used essentially the same critical assets at the *decisive points*.⁶⁵ Additionally, the deployment to and the array of forces in Greece created a major challenge. Consequently, the relatively short planning period diminished the degree of harmonization.

While tactical aspects normally drove *synchronization*, the arrangement for Operation Mercury centered mainly on its critical constraints, most notably air transportation and resupply. Hence, the detail of *synchronization* that a German Staff typically produced appeared unachievable. The verification of planning assumptions, like the timing for the transition between the two waves of airdrops lacked critical assessments and rehearsals.⁶⁶ This would jeopardize success during the operation. Abysmal intelligence about an apparently inferior enemy and incipient overconfidence degraded the necessity of *synchronization*, hampering the development of branches and sequels.⁶⁷ Consequently, the constraints and limitations dictated the arrangements of decision points rather than tactical conditions.⁶⁸ Thus, the purposeful arrangement and harmonization of tactical action was unsatisfying, especially in relation to the mission-critical airborne phase. A more thorough plan could have revealed at least some shortfalls. However, the *intent* as an essential part of *Auftragstaktik* would still provide guidance and *unity of effort*, paired

⁶⁵ Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte*, 316-317.

⁶⁶ Ross, *The Battle of Crete*, 42.

⁶⁷ Citino, *Blitzkrieg to Desert Storm*, 48.

⁶⁸ Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte*, 309.

with the expectations of subordinate echelons to utilize this freedom. In addition, the deliberate German willingness to accept more *risk* would mitigate the *synchronization* shortfalls.

The third lens judges the exposure to *risk* as an element of the German art of operations. According to the current US Army doctrine, the German perception led to a catastrophic acceptance of *risk*.⁶⁹ However, the willingness to incorporate such a degree of it enabled the operation in the first place. Although the maneuver presented an evolutionary landmark in joint warfare, it appeared almost like a gamble.⁷⁰ Lacking *mass*, *surprise*, mutual support, and having a disadvantageous force ratio, it incorporated the virtually isolated use of airborne troops as an element lacking consistent operational experience.⁷¹ Their vulnerability, limited *lethality*, and *mobility* created dangerous weaknesses. This challenge increased because the only way for heavy reinforcement was via the Aegean Sea – through the predominant British Navy.⁷² On top of that was the overarching problem of hastily *synchronizing* complex *lines of operation* with limited numbers of air and sea transportation means. Consequently, the effect of *surprise* diminished.⁷³

Almost careless planning assumptions also presented high risks. The use of airborne means was based on the already mentioned faulty intelligence picture and the assessment to seize key terrain quickly. While reinforcement and resupply would be provided via the captured airfields, the operational need to create branch plans diminished in the German perception.⁷⁴ In

⁶⁹ Army Techniques Publications 5-19, *Risk Management* (Washington: Government Printing Office, 2014), 1-8. Thereafter, severity is defined catastrophic when consequences of an event, if it occurs, are expected to include death, unacceptable loss or damage, mission failure, or the loss of unit readiness.

⁷⁰ Biank, “The Battle of Crete: Hitler’s Airborne Gamble,” 47.

⁷¹ Antill, *Crete 1941*, 33. The German attacker had an overall 1:2 disadvantage.

⁷² Richter, *Operation Merkur*, 83.

⁷³ Citino, *Blitzkrieg to Desert Storm*, 42-43.

⁷⁴ Cox, “The Battle of Crete,” 18-19; Porch, *The Path to Victory*, 170 who underlines that the German plan did not incorporate branches for a successful adversary defense or turnmoils.

addition, the estimate to support the initial attack with air transport and cover was inaccurate. It accounted less for frictions. The unexpected delays and technical problems between the two air transport waves highlighted the lack of *anticipation*. This *risk* would almost jeopardize the whole operation on the first day.

Most of the German *risk* mitigation fell short. The idea of creating tactical *surprise* by using airborne means became ineffective due to deficient operations security.⁷⁵ However, the easily achieved air superiority virtually offset many *risks* and saved the operation.⁷⁶ Furthermore, the inherent German ability throughout the chain of command to adapt purposefully to an unprepared situation and to take the *initiative* was essential. Both conditions were mission-critical and saved the execution from total failure more than once.

The Execution

Within this subsection, the three lenses of *intent*, *synchronization*, and *risk* are applied deliberately to mission-critical events or prevailing principles. By limiting tactical details, this allows emphasizing how these criteria shaped the execution. Each service knew about its mission-essential tasks.⁷⁷ This scheme was passed down to the lowest level, created *shared understanding*, and encouraged a decentralized execution of the plan. Citino acknowledges that the German air-assaulted forces were temporarily without a leader, but they were not leaderless.⁷⁸ Since the German command philosophy stressed the importance of empowering subordinates,

⁷⁵ Biank, "The Battle of Crete," 58-59; Saunders, *Crete*, 40. Porch, *The Path to Victory*, 166, emphasizes that the use of airborne entities in Greece to capture the Corinth Canal revealed their presence.

⁷⁶ Alan Vick, "Snakes in the Eagle's Nest: A History of Ground Attacks on Air Bases," (Research Paper for Research and Development Corporation, Santa Monica, 1995), 33-35.

⁷⁷ Ross, *The Battle of Crete*, 56-57.

⁷⁸ Citino, *Blitzkrieg to Desert Storm*, 43-44.

they were able to compensate for unexpected losses even of key leaders, such as the assigned Ground Force Commander General Wilhelm Suessmann, who died during the approach.⁷⁹ This highlights the mission-critical German ability to adapt and act within the guiding frame of a given *intent* without further orders.⁸⁰

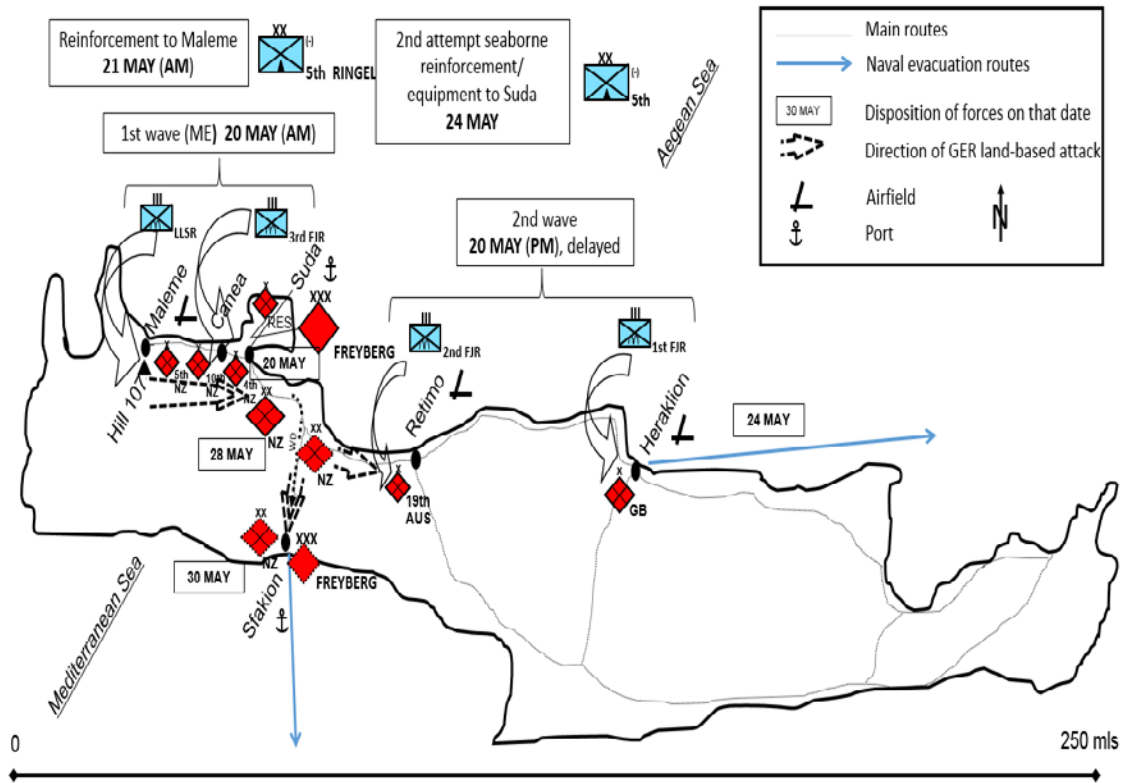


Figure 2. Cursory Tactical Situation on Crete in May 1941.

Source: Figure created by author using information from Porch, *The Path to Victory*, 156; Antill, *Crete 1941*, 46-77.

⁷⁹ Richter, *Operation Merkur*, 121-123, uses the airborne attack on Chania at 20 May 1941 to stress this ability. Although more than 50% of the paratroopers, including key leaders, died during this airdrop, the remaining entity of a battalion was still able to conduct a coordinated attack on Chania.

⁸⁰ Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte*, 310-313, who also promotes the mythical example of Oberstabsarzt Dr. Mueller, leading a squad counterattack.

Another example highlighting the importance of the *intent* emerged during the arrival of General Julius Ringel as new Ground Force Commander with the 5th Mountain Infantry Division on 21 May in Maleme. Taking over the command immediately, he assessed the situation on the ground and reframed the course of action. Due to *cognitive efforts* of orchestrating tactical action in time, space, and purpose, General Ringel adapted the high-loss vertical envelopment to a sound land-based operation.⁸¹ These examples emphasize the significant advantage the German Wehrmacht took out of the combination of *Auftragstaktik* and a detailed higher's *intent* to execute *disciplined initiative*. They were expected and able to adjust their scheme of maneuver to unanticipated situations while still working towards the desired objective.

Focusing on the second criteria, the Germans failed to *synchronize* effectively their initial action in time and space. Flawed intelligence reports, time restrictions, and superficial logistical estimates caused enormous frictions. Although the German Wehrmacht achieved success in the end, their failure to validate critical assumptions influenced the arrangement and almost jeopardized the endeavor.

The concept of operations contained a two-phased airborne drop over different locations. After an initial wave in Maleme and Canea, the airplanes had to return to Greece to receive, resupply, and embark paratroopers for the second wave to Retimo and Heraklion. Including flight times, eight hours made up the estimate – assuming no major frictions. This planning assumption served the supporting air means to plan the suppression of the adversary's air defense during the airdrop. The first wave already revealed frictions and grave delays. The ground conditions and the coordination on the improvised airfields in Greece deteriorated the timing. Especially long lasting refueling processes, technical breakdowns, confusion between the squadrons, and limited

⁸¹ Richter, *Operation Merkur*, 172.

visibility due to heavy dust delayed their departure.⁸² Unfortunately, the supporting air means stayed on the initial timetable, being unaware of the delay. Communications means that could have informed them were already on their way to the Eastern front.⁸³ Consequently, the Luftwaffe did not arrive *synchronized* over Retimo and Heraklion with their air support. While the paratroopers debarked piecemeal they faced a still very capable and deadly defense. Heavy losses and dispersed German troops were the results and almost led to an overall mission break-off in the eastern part of Crete. This failure appears even more severe since General Student knew about the second wave's delay but did not act. Aware of the consequences that would occur, he neither directed the drop to Maleme, where the air defense was degraded, nor did he delay the second wave to the following day, allowing a new attempt to *synchronize* critical assets.⁸⁴

Another failure to harmonize Luftwaffe means existed in the naval *line of operation*. Surprisingly, this approach was introduced late during the planning process.⁸⁵ Since the British Navy enjoyed superiority and the Axis means were very limited, it appears incomprehensible why the Luftwaffe did not provide sufficient air support during the critical seaborne transportation. After sinking a first part of this urgently needed reinforcement, the Luftwaffe changed its efforts and expelled the Allies' naval means from the adjacent sea. Although this enabled a second attempt to arrive on Crete, it was too late to contribute decisively.⁸⁶ Instead of degrading British

⁸² Ibid., 127.

⁸³ Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte*, 309.

⁸⁴ Richter, *Operation Merkur*, 127-128; Anthony Farrar-Hockley, *Student* (New York: Ballantine Books, 1973), 92-95.

⁸⁵ Walter Ansel, *Hitler and the Middle Sea* (Durham: Duke University Press, 1972), 268-270.

⁸⁶ John Hackett, "Student," in *Hitler's Generals*, ed. Corelli Barnett (New York: Grove Press, 1989), 471.

means as a precondition to conduct seaborne reinforcements, the Germans suffered again in the first stage from insufficient *synchronization* between different *lines of operation*.⁸⁷

These efforts improved when General Ringel took over command. As new Ground Force Commander and emphasizing *unity of command*, he orchestrated available means and changed the character of the operation from a gamble to an operation planned in detail. His adapted concept focused more on enabling combined efforts, like avoiding frontal attacks in favor of envelopment.⁸⁸ To summarize, the examples emphasize the effects of a cursory and hasty centralized planning that caused a critical amount of improvisation and turned catastrophic *risk* into reality. Once decentralized planning became more appropriate and the leader had to reframe his approaches, *synchronization* along with *unity of effort* improved dramatically and provided the desired effects.⁸⁹

The third lens, *risk*, uses one additional consideration to underline the prevailing perception. While Douglas Porch describes the following choice as a “desperate” attempt, it marked the boldest operational decision during Operation Mercury.⁹⁰ On 21 May, after the disastrous failure of the airborne drops and the seaborne reinforcement, the operational artist, General Loehr, had to make a decision. He chose a *risky* all-in-approach to retain the *initiative*. Although the Germans did not control the airfield in Maleme and Commonwealth troops still attacked it with indirect fire from the dominant, adjacent terrain (Hill 107), the situation there appeared most promising for a decisive operation than in any other area.⁹¹ His adaptation seemed

⁸⁷ Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte*, 316-317; Porch, *The Path to Victory*, 171-173.

⁸⁸ Richter, *Operation Merkur*, 172-173.

⁸⁹ Antill, *Crete 1941*, 65.

⁹⁰ Porch, *The Path to Victory*, 171; Citino, *Blitzkrieg to Desert Storm*, 46.

⁹¹ Richter, *Operation Merkur*, 136; Citino, *Blitzkrieg to Desert Storm*, 46.

as if he would “reinforce a failure.”⁹² General Loehr redirected the air-mechanized deployment of the 5th Mountain Infantry Division, formerly scheduled to reinforce the area around Heraklion. Additionally, he formed an impromptu operational airborne reserve and sent both along with all available air support to Maleme, the new main effort of Operation Mercury. Accepting additional *risk* in other parts of Crete, the *concentration* of combat power allowed him to expel the adversary and to open the airfield as mission-critical key terrain.⁹³ From this point on, the German Wehrmacht was able to reinforce and resupply their almost culminated troops. The *operational reach*, the *lethality*, and the improved *synchronization* unfolded a successful ground based attack to the east of Crete.⁹⁴ Additionally, the adversary contributed to this success unintentionally. Due to their internal problems, they failed to coordinate the employment of forces (reserve) and withdrew unnecessarily from key terrain, such as the defending battalion from Hill 107, while still waiting for the German main thrust via a seaborne assault.⁹⁵ In the end, General Loehr’s decision was in line with the inherent German *adaptability* and *flexibility* to ambiguous situations. It created a mission-critical opportunity that would turn the tide. At this moment, Crete was almost lost for the Commonwealth troops.

Concluding Remarks

Operation Mercury was a reflection of German operational skills and their contemporary art of operations. Bold, ambitious, and very receptive to *risk*, their utilization of *Auftragstaktik* combined with a clear *commander’s intent*, and *unity of effort* created favorable conditions. Nevertheless, as situations changed, adaptations occurred on every appropriate level. The case

⁹² Saunders, *Crete*, 173.

⁹³ Uhle-Wettler, *Hoehe- und Wendepunkte deutscher Militaergeschichte*, 311-316; US Department of the Army, *The German Campaigns in the Balkans*, 133.

⁹⁴ US Department of the Army, *The German Campaigns in the Balkans*, 133-137.

⁹⁵ Porch, *The Path to Victory*, 171; Richter, *Operation Merkur*, 138-140.

study revealed the application of multiple *elements of operation art*. Especially the *cognitive effort* to reframe an *intent* within the strategic context provided critical input for a flexible adaption during planning and execution. However, after two successful years of fighting in World War II, the German work became less precise and increasingly constrained. The assumed disruptive effect of airborne landings combined with air superiority was neither able to achieve *surprise* nor to *mass* sufficient forces. Poor initial *synchronization* in time and space further deteriorated the situation. Based on deficient intelligence, hasty planning, and flawed logistical estimates, the Germans almost created mission failure. The acceptance of high *risk*, the adaptable command philosophy guided by clear *intents*, and an improved *synchronization* against a desolate acting adversary allowed them to succeed. Strategically, however, there was no intent to exploit this expensive victory or to tie it into existing operations in the Mediterranean Sea, such as those ongoing with General Erwin Rommel's Afrika Korps.

III.2 Operation Husky

It beats me how anyone can think you can run a campaign in that way, with each of the three Commanders of the three services about 600 miles from each other.

—General Bernhard Montgomery, *MONTGOMERY: D-Day Commander*

Strategic Considerations

The strategic agenda for the American and British military to “defeat Germany first” was set during the ARCADIA conference.⁹⁶ While the American troops took over the initiative in the Pacific theater against Japan, the Allies conducted strategic bombing and terrified the German population to support – in Clausewitz' words – their absolute war's aim: final victory.⁹⁷ Entering

⁹⁶ December 1941-January 1942; D'Este, *Bitter Victory*, 33.

⁹⁷ Clausewitz, *On War*, 90-99 and 582.

the adjacent European theater, the Allies successfully conducted Operation Torch as their first major operation in North Africa.⁹⁸ The German surrender at Stalingrad (February 1943) and the Soviet's counteroffensives, heavily supported by the Allied supplies in the form of Lend-Lease, turned the tide on the Eastern front.⁹⁹ During a British dominated conference in Casablanca (January 1943) the Allies agreed upon a follow-on commitment in the Mediterranean Sea. They postponed an American favored cross-channel invasion of France until 1944.¹⁰⁰

The attack on the southern periphery would accomplish several strategic objectives: open up a second front against the Axis in Europe, follow Stalin's request to divert Axis forces from Russia, reopen vital adjacent sea lines of communication, and eliminate Italy from the war. However, strategic guidance on follow-on operations was indecisive and established these aims "as an end in itself" – a decisive victory was never explicitly contemplated in the planning.¹⁰¹ It marked the beginning of a protracted struggle among the Allies to reach strategic agreement.¹⁰²

⁹⁸ Operation Torch lasted from November 1942 to May 1943; Porch, *The Path to Victory*, 412-414, emphasizes not only the German-Italian surrender in North Africa in spring 1943 but also the magnitude of the loss of material and fighting expertise.

⁹⁹ David M. Glantz and Jonathan M. House, *When Titans clashed: How the Red Army stopped Hitler* (Lawrence: University Press of Kansas, 1995), 150-151, elaborate on the effect of the Lend-Lease. Richard Overy, *Why the Allies won* (New York: Norton, 1995), 86, adds the literally simultaneous impact of the surrender in Africa and in Stalingrad and the loss (surrender or annihilation) of up to 48 Axis divisions.

¹⁰⁰ D'Este, *Bitter Victory*, 50-52; Maurice Matloff, *United States Army in World War II: The War Department; Strategic Planning for Coalition Warfare 1943-1944* (Washington: Office of the Chief of Military History, 1959), 38.

¹⁰¹ D'Este, *Bitter Victory*, 50 and 524; Porch, *The Path to Victory*, 417. This resonates with considerations about an overall approach in the Pacific Theater during the Casablanca conference; Matloff, *United States Army in World War II*, 36-37.

¹⁰² Garland and Smyth, *United States Army in World War II*, 23 underline that the American delegation favored a clear-cut approach about subsequent steps, favoring the cross-channel attack, while the British representatives voted for a more observant role, tending to exploit the success and attack Italy's mainland.

Among the Mediterranean islands, Sicily was the best option to achieve the objectives and keep the momentum. Invasion capabilities and forces were available, but lacked experience and institutional knowledge of amphibious, airborne, combined, and joint operations against stiff Axis' resistance. Concurrent to Operation Torch, American General Dwight Eisenhower was appointed Supreme Allied Commander. As operational artist for this endeavor, he gained authority but also responsibility to plan and execute this mission. From the beginning, his time was consumed by "political and inter-allied problems," excluding him from important decisions of Operation Husky.¹⁰³ Subordinate to him, three equal British component commanders (Generals Harold Alexander (Land), Arthur Tedder (Air), and Admiral Andrew Cunningham (Naval)) established a "triumvirate."¹⁰⁴ Although General Eisenhower disliked this structure, he was aware of the tense inter-Allied situation.¹⁰⁵ Upon his recommendation, the Combined Chiefs of Staff (CCS) would approve subsequent exploiting operations.¹⁰⁶ The Allied penetration of "Fortress Europe" became the "most complex amphibious operation in the history of warfare" that was planned in the field – with its key headquarters dispersed, leaders distracted, and an Allied commander that practiced a more cooperative and persuasive leadership style.¹⁰⁷

¹⁰³ Mark Zuehlke, *Operation Husky: The Canadian Invasion of Sicily; July 10 – August 7 1943* (Vancouver, Canada: Douglas & McIntyre, 2008), 33. See for an assessment of General Eisenhower's role D'Este, *Eisenhower*, 438.

¹⁰⁴ Garland and Smyth, *United States Army in World War II*, 420.

¹⁰⁵ D'Este, *Bitter Victory*, 50 and 71.

¹⁰⁶ Matloff, *United States Army in World War II*, 152-155. The Allies chose a command structure that was already defected in the Pacific Theater, Maurice Matloff and Edwin M. Snell, *United States Army in World War II: The War Department; Strategic Planning for Coalition Warfare 1941-1942* (Washington: Office of the Chief of Military History, 1980), 123-126.

¹⁰⁷ D'Este, *Bitter Victory*, 74 and 70-75; Steven J. Zaloga, *Sicily 1943: The Debut of Allied Joint Operations* (Long Island City: Osprey Publishing, 2010), 5-6; Kerry E. Irish, "Cross-Cultural Leadership: Dwight D. Eisenhower," in: *The Art of Command: Military Leadership from George Washington to Colin Powell*, ed. Harry S. Laver and Steven W. Boutelle (Lexington: University Press of Kentucky, 2008), 95-96.

The Adversary

Hitler's absolute war dogma "final victory" remained within the German dominated Axis although the worsening situation demanded a reassessment. The General Staff was diminished to "an amplifier of Hitler's wishful thinking."¹⁰⁸ In spring 1943, the aims were to preserve gained territory, exhaust Allied efforts, plan a branch for an Italian collapse, and prevent a spillover of fighting. Although the Italian commander in Sicily received nominal control over German troops, General Albert Kesselring was the Commander-in-Chief South. He initially gained control of two German division equivalents and later 250,000 Italian troops that differed significantly from German soldiers in expertise and enthusiasm.¹⁰⁹ General Kesselring integrated low-grade Italian defense capabilities and split German forces for two reasons: to conduct flexible counterattacks since the Italians were not able to defend the entire coastline, and to disarm the Axis' partner in case of defections (Operation Alarich).¹¹⁰ Overall, the approach was an area defense that transitioned into delay operations to trade space for time.¹¹¹ Hitler was not convinced that the main thrust of an imminent Allied invasion focused on Sicily. Therefore, management of shortfalls and diminishing capabilities were omnipresent. Axis' air and naval means were largely degraded once the attack began.¹¹² Concurrent to operations in Sicily, Operation Zitadella, the intent to reconstitute on the Eastern front at Kursk, ended in August 1943 as a result of Operation

¹⁰⁸ Porch, *The Path to Victory*, 421.

¹⁰⁹ Ken Ford, *Assault on Sicily: Monty and Patton at War* (Gloucestershire, United Kingdom: Sutton Publishing Limited, 2007), 63; Garland and Smyth, *United States Army in World War II*, 75-87.

¹¹⁰ For Operation Alarich see Garland and Smyth, *United States Army in World War II*, 50-51.

¹¹¹ D'Este, *Bitter Victory*, 198-205.

¹¹² Zuehlke, *Operation Husky*, 90; D'Este, *Bitter Victory*, 207-210.

Husky, ceding the strategic initiative to the Soviet Union until war's end, while moving additional forces to Italy.¹¹³

The Planning

General Omar Bradley, Corps Commander during Operation Husky, summarized the planning process as “a fog of indecision, confusion, and conflicting plans.”¹¹⁴ Obviously, this did not provide best conditions for an appropriate *intent*, the first lens of this monograph.¹¹⁵ The following operational question sketches the Allied challenge: How to arrange multinational forces, command coequal services, and reduce the fortified island of Sicily with constricted air, airborne, amphibious, land, and naval means, no later than the middle of July?

Vague political guidance, with unspecified elements such as end states or enemy conditions, individualistic commanders' biases, and limited collaborative planning were the prevailing aspects causing deadlocks.¹¹⁶ Although General Eisenhower had the authority and responsibility, the CCS tasked General Alexander with the detailed planning.¹¹⁷ None of the two Generals translated the political aim into an *intent* to enhance *unity of effort*.¹¹⁸ A biased British-

¹¹³ US Joint Chief of Staff, *Joint History Office: World War II; Inter-Allied Conferences* (Washington: Government Printing Office, 2003), 25-29 and 38-42.

¹¹⁴ D'Este, *Bitter Victory*, 142.

¹¹⁵ Zaloga, *Sicily 1943*, 32.

¹¹⁶ Garland and Smyth, *United States Army in World War II*, 72-75.

¹¹⁷ They tasked General Alexander during the Casablanca planning conference, especially since the British Prime Minister Winston Churchill assessed General Eisenhower as too inexperienced to plan and conduct such an operation. See Zuehlke, *Operation Husky*, 33; Porch, *The Path to Victory*, 417-421; Garland and Smyth, *United States Army in World War II*, 55.

¹¹⁸ Allan R. Millett, Peter Maslowski, and William B. Feis, *For the Common Defense: A Military History of the United States of America from 1607 to 2012* (New York: Free Press, 2012), 402; William B. Breuer, *Drop Zone Sicily: Allied Airborne Strike July 1943* (Novato: Presidio Press, 1983), 202, in which General Eisenhower blamed himself for failing to provide sufficient directive.

dominated command committee encumbered General Eisenhower, so it was difficult for him to perform as an operational artist and exercise his privileges and duties. Additionally, his detached command style, his tendency to delegate decisions, the awareness of inter-allied tensions, and the fact that he was initially pleased working with General Alexander offered his subordinates much more leverage. This deliberate decision by General Eisenhower to delegate his role as operational artist to General Alexander relegated him to a background role in the execution of Operation Husky.¹¹⁹ General Alexander was neither able nor willing to utilize this freedom.¹²⁰

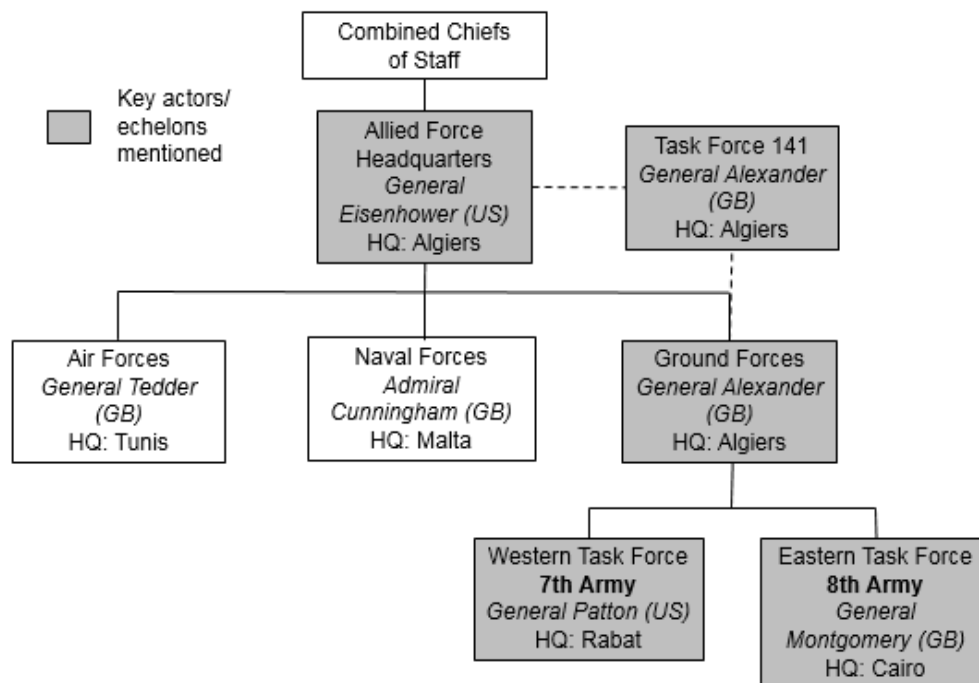


Figure 3. Chain of Command Operation Husky.

Source: Figure created by author using information from D'Este, *Bitter Victory*, 583; Porch, *The Path to Victory*, 418-421.

¹¹⁹ Irish, *Cross-Cultural Leadership*, 100; D'Este, *Eisenhower*, 423-438. For the assessment of their good working relation see Thomas E. Ricks, *The Generals: American Military Command from World War II to Today* (New York: The Penguin Press, 2012), 85.

¹²⁰ Ford, *Assault on Sicily*, 27-29.

While General Alexander commanded the ongoing fighting in Tunisia, he also created the British dominated ad hoc Task Force 141 as the planning nucleus for Operation Husky. Unfortunately, he provided neither appropriate guidance nor his *intent* to enable creative staff work or enhance *shared understanding*. Thus, an inexperienced staff, unfamiliar with joint and combined planning of that scale, ran this protracted and rudderless process. Regrettably, they also lacked a full-time, acknowledged leader who could have bridged shortfalls, framed the planning, and literally filled the inclining command vacuum.¹²¹ Other services and key leaders, with widely dispersed headquarters, were reluctant to give up their independence and initially paid less attention to the upcoming operation.¹²² Therefore, the fateful combination of a biased planning environment and the questionable performance of Task Force 141 failed to provide an appropriate *intent* to enhance subordinate arrangements of tactical action. Instead of focusing on the enemy's vulnerabilities, the staff concentrated on logistical considerations, centered around the essential mission to increase *operational reach* on Sicily – a view broadly interpreted by the services.¹²³

Most seriously, General Alexander failed to create *unity of effort* and did not solve a month-long standoff-planning situation. Doing so, he carried forward the tenets of his superior's command style. Furthermore, General Alexander was biased and perceived the Americans as "ill-trained and quite useless" force.¹²⁴ He was reluctant to assign decisive tasks to the US Army and inclined to his British comrades. In doing so, General Bernard Montgomery's late contribution discarded months of planning and dictated the terms of the final *operational approach* literally.¹²⁵

¹²¹ D'Este, *Bitter Victory*, 72; Zuehlke, *Operation Husky*, 33-35.

¹²² Porch, *The Path to Victory*, 420.

¹²³ Cote, "OPERATION Husky: A critical Analysis," 5-6.

¹²⁴ Scott G. Hirshson and Paul J. Pugliese, *Patton: A Soldier's Life* (New York: HarperCollins, 2002), 312-313.

¹²⁵ Ford, *Assault on Sicily*, 29-35; Hirshson and Pugliese, *Patton*, 384.

Both Generals sharing overconfidence and the view that US forces were inferior, they preferred a flexible opportunistic approach and did not appreciate the American preference for a clear-cut *intent* and rigid planning guidance.¹²⁶ Furthermore, they prevented a cohesive team effort and the creation of *trust* based relationships for the difficult execution phase.

Evidence for the effects of an insufficiently operationalized *intent* revealed in the planning for the decisive phase: While the “reduction of Sicily” was not a tactical term, the Army commanders’ perception varied extremely between a terrain focused, cautious approach to simply occupy Sicily or an aggressive attack to defeat the enemy.¹²⁷ Both concepts implied different consequences for the application of military forces. The preconditions for a successful *synchronization* were difficult because the most critical frame of an *intent* and a deduced *shared understanding* were missing. Severe frictions during the execution appeared almost inevitable.

Applying the *synchronization* lens reveals a distinctive difference between the arrangements of multiple *lines of operations*. As depicted, inter-service rivalries and national biases flourished in a contaminated environment. The core challenges were the insufficiency of *shared understanding* and the void role of a decisive leader. Up through the amphibious assault, *synchronization* especially between the naval and army elements worked, enabled some tactical *surprise*, and allowed critical naval gunfire support.¹²⁸ In contrast, the air force “refused to coordinate its planning.”¹²⁹ During the preparation for Operation Husky, neither navy nor army planners were informed about the protection or close air support coverage they could expect.

¹²⁶ Zuehlke, *Operation Husky*, 33; Nigel Hamilton, *Monty: The Battles of Field Marshal Bernard Montgomery* (New York: Random House, 1994), 180-181.

¹²⁷ Ford, *Assault on Sicily*, 247.

¹²⁸ Garland and Smyth, *United States Army in World War II*, 421; S.W.C. Pack, *Operation Husky: The Allied Invasion of Sicily* (New York: Hippocrene Books, 1977), 47-60.

¹²⁹ Garland and Smyth, *United States Army in World War II*, 106.

General Tedder explained this decision with his primary task to neutralize Axis air power and the urgent need of Sicilian airfields to support the land-based approach. Assessing this as “totally unrelated to the Naval and Joint Military Plan” underlines the consequences for the wanting of an *intent* and *shared understanding* of the strategic frame.¹³⁰

The land-based operation and conditions to achieve were less *anticipated* since a diffident General Alexander focused on getting his forces “firmly ashore.”¹³¹ He was reluctant to install fundamental coordination measures beyond initial objectives (such as airfields and ports) or visualize his idea for subsequent steps after the breakout of the beachheads. Therefore, Generals George Patton (7th Army) and Montgomery (8th Army) had to discern how to unfold and *synchronize* their approaches.¹³² Consequently, both land forces fought mostly independent battles and developed problems that would facilitate inter-Allied discussions for years.¹³³

Risk, the third lens, received significant consideration but more in a pessimistic than an optimistic view. General George Marshall criticized the planning as being “too conservative” for lacking bold, calculated *risks*.¹³⁴ In retrospect, General Eisenhower blamed himself for a too cautious operational approach.¹³⁵ At least the incorporation of the recent airborne domain, via airdrop or gliders, did not support this assessment. It was a deliberate choice combined with

¹³⁰ D’Este, *Bitter Victory*, 170-175; Porch, *The Path to Victory*, 420.

¹³¹ Blumenson, *Patton*, 189. So did British Prime Minister Churchill who addressed Eisenhower to “stiffen operational planning.” Garland and Smyth, *United States Army in World War II*, 421, emphasize that a joint plan focusing on the destruction of the enemy or at least preventing them from evacuating Sicily was wanting.

¹³² D’Este, *The Path to Victory*, 421; Hirshson and Pugliese, *Patton*, 385.

¹³³ Carlo D’Este, *World War II in the Mediterranean: 1942-1945* (Chapel Hill: Algonquin Books of Chapel Hill, 1990), 48.

¹³⁴ Garland and Smyth, *United States Army in World War II*, 66.

¹³⁵ D’Este, *Bitter Victory*, 525.

danger to increase opportunities against the Axis' defense.¹³⁶ The emerging boldness, or “unsound operation” as others assessed it, became clear by considering the circumstances: constrained preparations for the American and British airborne troops and pilots, terrain restrictions in Sicily, and conducting the assault at night.¹³⁷ Additionally, a broad use of deception operations such as Operation Mincemeat achieved some strategic irritation on the Axis side – although General Kesselring was less influenced by these efforts.¹³⁸

Other aspects revealed a less proactive use of *risk*. As mentioned earlier, the *operational approach* focused on logistical considerations such as seizing airfields and ports rather than on the enemy. It constrained the creativity of Task Force 141. In conjunction with faulty intelligence estimates, indicating a strong Axis resistance along the coast, the final plan of Operation Husky emphasized *concentration* and mutual support relations of the army forces. Thus, the concept of an independent, two lines approach from Palermo and Catania envisioned in Casablanca was reduced to a methodical, frontal attack along the narrow eastern coastline. Sequels such as envelopments through the center of Sicily were discounted since this would have been a task for the apparently inferior American 7th Army.¹³⁹ Thus, the predominant handling of *risk* during the planning phase emphasized an overcautious approach to ensure success instead of creating opportunities. Subsequently, during its application, the concept transitioned from a battle of maneuver to a battle of attrition.¹⁴⁰

¹³⁶ Zaloga, *Sicily 1943*, 33.

¹³⁷ Ford, *Assault on Sicily*, 49; Garland and Smyth, *United States Army in World War II*, 92-93.

¹³⁸ Samuel W. Mitchum, Jr. and Friedrich von Stauffenberg, *The Battle of Sicily* (New York: Orion Books, 1991), 23; Cote, “OPERATION Husky: A critical Analysis,” 9-10.

¹³⁹ Porch, *The Path to Victory*, 418-419.

¹⁴⁰ Garland and Smyth, *United States Army in World War II*, 419; Ford, *Assault on Sicily*, 255.

The Execution

Operation Husky suffered from the aftermath of the inharmonic planning phase and the unsolved command vacuum. This section applies the lenses on decisive points to highlight the prevailing application of a contemporary art of operations.¹⁴¹ The criteria reveal how the Allies failed to take decisive actions or to adapt their scheme in these events. Two examples facilitate a combination of all lenses and provide evidence: first, an unplanned and badly communicated boundary dispute on 13 July; second, the withdrawal of the Axis forces via the Messina Strait.

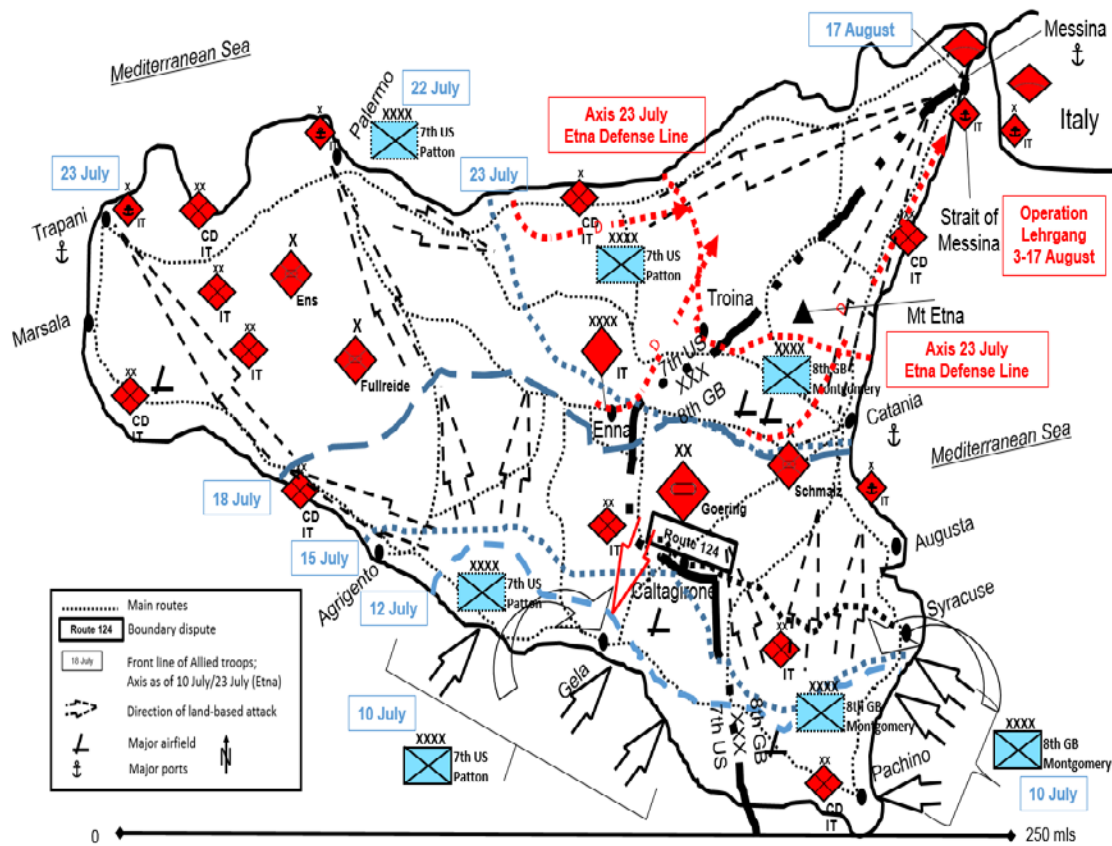


Figure 4. Cursory Tactical Situation on Sicily in July/August 1943.

Source: Figure created by author using information from Porch, *The Path to Victory*, 418; D'Este, *Bitter Victory*, 146-147 and 420-421; Zaloga, *Sicily 1943*, 4-87.

¹⁴¹ Army Doctrine Reference Publication 1-02, *Operational Terms and Military Symbols* (Washington: Government Printing Office, 2012), 1-12.

As depicted in the planning subsection, the *intent* and its negative effects on arranging tactical action or taking *risk* remained the core challenge of this operation. After air and *risky* airborne shaping operations, the two armies conducted a joint and combined amphibious assault on the southeastern corner of Sicily on 10 July. Subsequently, a twofold approach was planned. As the main effort, General Montgomery's 8th Army attacked along the eastern coastline to seize Messina while General Patton's 7th Army, "dismissed to the role of flank guard," was the supporting effort.¹⁴² The ambiguous task to reduce Sicily mainly contained the terrain-based seizure of ports and airfields to avoid *culmination* and increase *operational reach*. Few operational thoughts focused on how to defeat the enemy, which would cause heavy frictions.¹⁴³ Nevertheless, both armies were mainly unopposed in securing the beachheads within seventy-two hours. After blocking the only remarkable Axis counterattack near Gela, entities of 7th Army aggressively exploited the momentum against the disarrayed Axis but quickly ran "out of objectives."¹⁴⁴ General Bradley's II Corps arranged further attacks via Enna and was about to encircle Task Force Schmalz, those Axis forces that provided stiff resistance against 8th Army in the vicinity of Catania. Unfortunately, this emerging opportunity remained untaken. Instead, General Montgomery disregarded the current dispositions. He decided on a methodical two-pronged attack unilaterally around Mount Etna. In doing so, he deliberately ignored the army's boundary and claimed a vital avenue of approach General Bradley had almost taken – Highway 124. General Montgomery's action caused a delay and relegated 7th Army to a flank role instead of allowing them to exploit this emerging opportunity. General Alexander refused to intervene

¹⁴² Zaloga, *Sicily 1943*, 61; Garland and Smyth, *United States Army in World War II*, 421-423.

¹⁴³ Ford, *Assault on Sicily*, 139.

¹⁴⁴ Garland and Smyth, *United States Army in World War II*, 422; Porch, *The Path to Victory*, 427.

and even General Eisenhower, equipped with ultimate authority and responsibility, declined to exercise appropriate command and control measures.¹⁴⁵ This incident represented a crucial turning point of Operation Husky that prevented an early Allied success and handed over the momentum to the Axis forces.¹⁴⁶

This boundary dispute provides evidence for the insufficient *intent* emerging from the planning phase. First, it did not create *shared understanding* between the key leaders about the ground-based attack. Consequently, each army developed its own framework on how to conduct a terrain-based approach. Underestimating the enemy's role in this, they disregarded the Axis's intent and capabilities. Especially 8th Army appeared overconfident. Accordingly, they neglected to take *risk* that would have shortened the operation with an early decisive victory.¹⁴⁷ Second, General Alexander's leadership role was still biased. He did not *anticipate* the crucial need of taking control and arranging his forces. At that point, he neglected a dominant American role in Sicily by permitting General Montgomery to degrade 8th Army's momentum.¹⁴⁸ Third, the *synchronization* failed to purposefully arrange military action and solve frictions on the ground. Instead of exploiting the opportunity to defeat Task Force Schmalz, the Allies provided the Axis forces more time to prepare their defense.¹⁴⁹

Shortly after this critical incident, General Patton requested permission to conduct a reconnaissance in force to create a more active role for 7th Army. By permitting this, General

¹⁴⁵ Ibid., 432. General Alexander also failed to inform General Patton instantly, which caused more confusion and weakened inter-Allied relations; D'Este, *Bitter Victory*, 414-415.

¹⁴⁶ Zaloga, *Sicily 1943*, 61.

¹⁴⁷ D'Este, *Bitter Victory*, 321-323; Blumenson, *Patton*, 199.

¹⁴⁸ Hirshson and Pugliese, *Patton*, 371-372; D'Este, *Bitter Victory*, 328; D'Este, *World War II in the Mediterranean*, 62.

¹⁴⁹ Zaloga, *Sicily 1943*, 61-62; Zuehlke, *Operation Husky*, 181-183.

Alexander finally abolished his at best cursory *operational approach* for Operation Husky and disestablished *concentration* and mutual *support* of his forces. Consequently, he indirectly encouraged his strong-willed commanders to fight their own battles. Certainly, General Patton took the *initiative* and achieved success by seizing Palermo, partially geared towards the media.¹⁵⁰ However, even General Kesselring appeared surprised by 7th Army's pointless approach to capture "unimportant terrain" instead of exploiting directly towards Messina "where a major decision had to be reached."¹⁵¹ Subsequently, a *risky* and less *synchronized* prestige race between the two Army commanders for Messina became another evidence for the inappropriateness of the *intent*.¹⁵²

The second incident focuses on the withdrawal of the Axis forces via the Messina Strait to the Italian mainland starting early August. No Allied plan was prepared for such a situation. Although their intelligence was well aware of the evacuation, the senior commanders failed to prioritize their efforts to intercept. While both ground forces were slowed down by either resistance (8th Army) or restricted terrain (7th Army), they created opportunities to bypass these areas by conducting amphibious assaults. Specifically, General Patton tried this approach at least three times during his race to Messina. He deliberately accepted high *risks* of casualties against the vehement advice of his subordinate commanders. No attempt achieved a considerable effect.¹⁵³

General Alexander addressed the evacuation evidence to Admiral Cunningham and General Tedder. Both service commanders decided on a conservative approach and were

¹⁵⁰ Porch, *The Path to Victory*, 437.

¹⁵¹ D'Este, *Bitter Victory*, 527; Mitchum and Stauffenberg, *The Battle of Sicily*, 201; Citino, *Blitzkrieg to Desert Storm*, 104.

¹⁵² Zaloga, *Sicily 1943*, 85-88.

¹⁵³ Ford, *Assault in Sicily*, 238; Porch, *The Path to Victory*, 441-443.

reluctant to commit their own resources to this heavily defended area. The Navy was risk-averse not to repeat the 1915 Dardanelle fiasco.¹⁵⁴ The Air Force refused to use its valuable B-17 or B-24 bombers, to decline the bombing of Italy, or to redirect its “predictable intervals” of attacking the Messina Strait with fighters and bombers.¹⁵⁵ Both did not *anticipate* the overall effect that they could have achieved by *synchronizing* their means. Since the Axis air defense would prove inadequate against high-flying bombers, the Air Force could have degraded the coastal artillery and enabled naval means to attack. Consequently, they conducted only insufficient and *desynchronized* attempts to intercept the evacuation.¹⁵⁶

Unfortunately, General Alexander did not *anticipate* the consequences of this inactivity. According to Albert Garland and Howard Smyth, this specific situation was not presented to his superior. However, General Eisenhower had already dedicated much of his time to follow-on operations that would face these Axis forces again. Thus, he was generally aware of the Axis’ extraction route. Unfortunately, he failed to adapt his approach and did not impose orders on his component commanders to take decisive action and shape the upcoming operation.¹⁵⁷ As a result, Operation LEHRGANG evacuated more than 60,000 German soldiers and considerable material to Italy. On 17 August, General Patton won the race to Messina and achieved a strategic objective of Operation Husky. However, comparable conditions appeared to be achievable at lesser costs

¹⁵⁴ Ibid., 444.

¹⁵⁵ Zaloga, *Sicily 1943*, 85; Ford, *Assault on Sicily*, 246.

¹⁵⁶ Garland and Smyth, *United States Army in World War II*, 376; Porch, *The Path to Victory*, 444; D’Este, *Bitter Victory*, 517.

¹⁵⁷ Porch, *The Path to Victory*, 443; Garland and Smyth, *United States Army in World War II*, 421.

and earlier if the means on each echelon had been better *synchronized* by an appropriate *intent* and a more decisive and adventurous leadership role.¹⁵⁸

Concluding Remarks

The Allies missed a great opportunity to design a grand strategy for the Mediterranean Sea during their various conferences in 1942/3. Consequently, “a series of *ad hoc* decisions, each setting forth objectives limited by available resources and the conditions of time” emerged for operational considerations.¹⁵⁹ The Allies’ “bitter victory” of Operation Husky was at substantial costs.¹⁶⁰ The suboptimal *cognitive effort* and the indecisive leadership role of the operational artist, General Eisenhower, but also the continued effect of indecisive leadership resulted in ambiguous guidance. This led to a restrained dialog between strategic and operational actors and affected the planning and execution component negatively. The vague direction and the implied *intent* became the key challenges. They generally failed to enhance *shared understanding* or create *unity of effort*. Continuously, biases, diffident leadership, and rivalry countered an appropriate application of a contemporary art of operations. Missing this cognitive context partially, the Allies rarely *anticipated* chances to exploit emerging opportunities or adapted their approach quickly enough. Consequently, they often failed to *synchronize* or refine multiple efforts in decisive situations.

Nevertheless, Operation Husky revealed critical aspects for follow-on operations. The significance of decisive leadership, exercised by an engaged operational artist, enhanced *synchronization*, and an *integration* of a better unity between inter-service or inter-Allied action emerged. Thus, from these experiences resulted an evolutionary step of contemporary art of

¹⁵⁸ D’Este, *Bitter Victory*, 522.

¹⁵⁹ Garland and Smyth, *United States Army in World War II*, 1.

¹⁶⁰ D’Este, *Bitter Victory*, 21.

operations. It improved Allied capabilities to continue its fighting in Italy and significantly enhanced their effort for Operation Overlord in 1944. After analyzing both case studies, the final section summarizes key outcomes and answers the research questions. Further, it emphasizes general considerations into recommendations about the current US Army concept of *operational art*.

Section IV: Consolidated Conclusion

The commander must allow his subordinates freedom of action, so long it does not adversely affect his overall intent. He may not, surrender to his subordinates' decisions for which he alone is responsible.

—Bruce Condell and David Zabecki, *On the German Art of War*

The thesis of this monograph focuses on a comparability of contemporary art of operations during World War II and the current US Army perception of *operational art*. Additionally, the challenging aspects that almost caused a failure and prevented an overarching success are of interest. The outcomes might be turned into normative recommendation for an enhanced understanding of *operational art*.

Merged Conclusions and Recommendations

The evaluation of the Operations Mercury and Husky using the frame of today's concept revealed comparable operational thoughts. The monograph emphasized that the German Wehrmacht and the US Army utilized analogous elements and principles during the *cognitive effort* and *planning and execution* components. Thus, they indicated similar characteristics of the current doctrinal definition and verified Gross' definition of the German art of operations during World War II.¹⁶¹ However, *operational art* is more than the rigid application of prescriptive,

¹⁶¹ ADP 3-0, 9; introduced in section II, Gross, *Mythos und Wirklichkeit*, 17.

cherry-picked *elements* in independent tactical action. The specific lenses of this monograph – *intent*, *synchronization*, and *risk* – underlined this assessment and encouraged a closer look.¹⁶²

As depicted, the Germans and the Allies suffered from significant problems *synchronizing* their tactical actions due to constraints in resources, overambitious assumptions, a faulty planning environment, or information deficits. Both failed to optimize the *components of planning* and jeopardized the mission during *the execution*. Operation Mercury's prevailing problems were related to time and resource limitations: Logistical constraints and numbers rather than tactical options drove their arrangements. Additionally, the disregard of intelligence as an essential driver of operations proved to be a continuous weakness. Thus, only the inherent acceptance of *risk*, the integral command philosophy guided by clear *intents*, and the embraced concept of adaptability turned the operation to a successful endeavor. In combination with an appropriate hierarchical command structure, headed by a decisively engaged operational artist, this *intent* created *unity of effort* and enabled the pursuit of the objectives from the lowest level upwards. Thus, Operation Mercury essentially profited out of the *cognitive effort* and the framing effect of the strategic context while *risk* and *Auftragstaktik* facilitated the operation.

Operation Husky suffered from an insufficient *cognitive link* that affected the second component negatively. The dialogues between the strategic and operational echelon were insufficient and left the latter with an ambiguous guidance. Although even doctrine required commanders to visualize their approach and to frame the ultimate objective, the operational artist, General Eisenhower, failed to do so.¹⁶³ The unfamiliar multinational environment caused further frictions. Subordinate leaders, notably General Alexander, failed to translate this vague *intent* and

¹⁶² Bruscano, "The Theory of Operational Art and Unified Land Operations," 3.

¹⁶³ FM 100-15, 12; FM 101-5, 36. General Eisenhower's indecisive leadership style resonates with incidents later in World War II (Falaise Gap, 1944); see D'Este, *Eisenhower*, 578-581.

to fulfill their critical leadership role during the execution. Consequently, the *operational approach* represented independent tactical actions without relating the overarching strategic context into it or *anticipating* future consequences.

As introduced in section II, the Allied understanding of *risk* differed qualitatively from the German perception. Hence, their acceptance to create opportunities instead of perceiving *risk* as an inevitable part of the operation did not equalize the wanting *intent*. Another consequence of the mismatch between the *two components of operational art* resulted in the lack of *unity of effort*. A biased planning environment marked by inter-service and inter-Allied rivalry prevailed instead of a coherent cooperation and *integration* towards the same strategic objectives. Thus, Operation Husky focused on the *planning and execution component* of their art of operations. The underestimation of the critical *cognitive effort* resulted in a biased environment, *non-anticipated* opportunities, and the accomplishment of the mission at higher costs.

However, both won their operations. How may the US Army profit from these special circumstances of the case studies? Two aspects emerge as normative recommendations.

First, the Army Operating Concept (AOC) released in 2014 delineates a demanding operational environment within a joint, multinational, and inter-organizational approach to “*Win in a Complex World*.”¹⁶⁴ The main parts of this concept focus on the *second*, the more practical *component of operational art*. Tenets like *simultaneity*, *mobility*, *endurance*, or *depth* highlight the application of combat power during *planning and execution*.¹⁶⁵ In contrast to that is the *first component*, the *cognitive effort*. Its inherent critical dialogue between strategic, operational, and tactical leaders to create and facilitate an understanding of the context and to formulate intentional guidance is only mentioned briefly. Technically speaking, the *intent* appears hidden in

¹⁶⁴ US Department of the Army, *The U.S. Army Operating Concept: Win in a Complex World* (Fort Eustis: Government Printing, 2014), 7.

¹⁶⁵ *Ibid.*, 20-22.

the overarching *mission command* philosophy, to be found on a subsequent layer of tenets, principles, or elements. Proclaiming a more prominent role for the operational artist in a multinational environment is not to weaken the strategic-operational link as some criticized it, but to enhance a two-way dialogue grasping the future complexity described in the AOC.¹⁶⁶ The operational artist, equipped with appropriate authorities and responsibilities would benefit from that. While General Loehr (Operation Mercury) adapted his approach due to changed conditions, the Allies were not able to do so. This resonates with the experiences of British Field Marshall Viscount Slim, who acted as operational artist during the Allied Burma Campaign (1943-1945).¹⁶⁷ Thus, more emphasis on the “cognitive linking of strategy and tactics” to understand the why of the operation appears to rebalance the two components and to underline the art piece.¹⁶⁸ Examples like the given one support Stephan Lauer’s conclusion to extricate *operational art* from a prescriptive perception.¹⁶⁹ He nests it in the realm of means in the end, ways, and means construct instead of identifying it as a rigid doctrinal application of military means. Especially imagination and experience empower the operational artist to *anticipate* and adapt in order to emerge with a refined operational approach – just like General Loehr did and General Eisenhower failed to do.¹⁷⁰ The view that future guidance may be less clear-cut and the military needs to incorporate ambiguity supports this critical conclusion.¹⁷¹ Thus, an *intent* must emerge that provides sufficient guidance for the arrangement of tactical tasks, acceptance of *risk*, and

¹⁶⁶ Justin Kelly and Mike Brennan, “The Leavenworth Heresy and the Perversion of Operational Art,” *Joint Force Quarterly* 56 (January 2010): 116.

¹⁶⁷ Viscount William Slim, *Defeat into Victory: Battling Japan in Burma and India, 1942-1945* (New York: Cooper Square Press, 2000), 210-211.

¹⁶⁸ Bruscino, “The Theory of Operational Art and Unified Land Operations,” 3.

¹⁶⁹ Lauer, “The Dao,” 1.

¹⁷⁰ *Ibid.*, 4-6.

¹⁷¹ Matthew C. Gaetke, “Certainty is Illusion: The Myth of Strategic Guidance” (Monograph, School of Advanced Military Studies Fort Leavenworth, 2015), 49-50.

anticipations of action in uncertain situations to empower the operational artist to utilize the authority and responsibility.

A second point of interest touches on the tension between *synchronization* and the dogma of *flexibility* throughout the echelons. This source of friction has emerged as a continuation in the application of *operational art* in both case studies. However, it was better handled in the German example. The diversity and interdependence of actors along several *lines of operations* and the reliance on technical support enhance the utilization of military power. Nevertheless, this affects the freedom of action and the *flexibility* to adapt independently. Especially entry operations often challenge tactical leaders to either follow a more rigid and synchronized timetable or to exploit emerging opportunities during the decentralized execution of tasks. Thus, military actions are nested with a larger synchronized and de-conflicted set of activities to maximize effects. Here, the room for truly independent action like *initiative* as a principle of the *mission command* philosophy diminishes. New domains such as cyber, the incline to multinational approaches, or political constraints via rules of engagements enlarge the complexity and might increase the tension between *synchronization* and *flexibility*. Related to the first key finding, the *intent* – as metaphorical glue between the *cognitive effort* and the *planning and execution* – is to provide valuable guidance. However, this assumes that the leader – from the operational artist down to the local, tactical leader – is empowered, culturally aware, and educated to make decisions and to resolve tensions.¹⁷²

Concluding Remarks

The application of a contemporary *operational art* enabled the Germans and the Allies to achieve their strategic objectives, marked with the connotation of a bitter or costly victory. This

¹⁷² United States Department of the Army, *Training and Doctrine Command Pamphlet 525-5-500: Commander's Appreciation and Campaign Design* (Fort Monroe: Training and Doctrine Command, 2008), 17, identifies those friction and the military leader to solve them.

monograph proved the similarity to the current US Army perception. Both case studies emphasized the usefulness of the *operational art* concept with a special consideration of the applied lenses of *intent*, *synchronization*, and *risk*. The normative recommendation of this evidence claims for the *cognitive linkage* as critical precondition and demands a more proactive role of military leaders to address the strategic context and the constraint of ambiguity to the political leaders. In doing so, the operational artist enhances the understanding of the context and strategic options. Consequently, a better translated and operationalized *cognitive effort* improves the *planning and execution* of tactical action in time and space. It also allows continuous refinements and the *anticipation* of *risk*, chance, or opportunities due to a purposeful *intent* down to the lowest level.

Both historical examples mark an evolutionary step in a challenging environment towards a better understanding and development of *operational art* today. Future studies might focus on the tension between *synchronization* and *mission command* principles to mitigate possible frictions. Additionally, since future operations *integrate* partners even on the tactical echelons, the relevance of the US Army's *operational art* concept in a whole-of-government or multinational environment might be of interest. This nests with the question on how to *integrate* and facilitate an operational artist in this more complex and constraint environment.

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