

Mastering Operational Art: Russian and Contemporary Understandings to Foster Creativity

A Monograph

by

MAJ Augustine H. Paul
US Army



School of Advanced Military Studies
US Army Command and General Staff College
Fort Leavenworth, KS

2020

Approved for public release; distribution is unlimited

REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>		
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 21-05-2020		2. REPORT TYPE Master's Thesis		3. DATES COVERED (From - To) JUN 2019 – MAY 2020	
4. TITLE AND SUBTITLE Mastering Operational Art: Russian and Contemporary Understandings to Foster Creativity			5a. CONTRACT NUMBER		
			5b. GRANT NUMBER		
			5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Augustine H. Paul, MAJ			5d. PROJECT NUMBER		
			5e. TASK NUMBER		
			5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army Command and General Staff College ATTN: ATZL-SWD-GD Fort Leavenworth, KS 66027-2301			8. PERFORMING ORG REPORT NUMBER		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) .			10. SPONSOR/MONITOR'S ACRONYM(S)		
			11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution is Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT Operational art is a fundamental planning activity that most of the world's Western ground forces study, practice, and execute at senior officer levels to ensure that tactical actions on the battlefield reflect strategic logic and purpose. Success is inevitably determined by the achievement of strategic goals and military leaders must effectively develop and manage campaigns that link tactical actions with strategic objectives to fulfill policy level end states. However, the complex nature of operational art is not always fully understood by its practitioners, especially the staff officers. This monograph will address the following core questions: What is operational art? How does systems thinking relate to the employment of operational art in campaign planning and management? What cognitive challenges do senior leaders and their staffs encounter when employing operational art? Operational planners have difficulty employing operational art in the planning and management of combat operations because operational art is not fully understood through a systems thinking perspective which produces the creative thinking required to satisfy strategic aims.					
15. SUBJECT TERMS operational art, systems thinking, creativity, non-linear thinking, strategy, Russian theory of operational art					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. PHONE NUMBER (include area code)
(U)	(U)	(U)	(U)	51	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

Monograph Approval Page

Name of Candidate: MAJ Augustine H. Paul

Monograph Title: Mastering Operational Art: Russian and Contemporary Understandings to Foster Creativity

Approved by:

_____, Monograph Director
Alice Butler Smith, PhD

_____, Seminar Leader
David Meyer, COL

_____, Director, School of Advanced Military Studies
Brian A. Payne, COL

Accepted this 21st day of May 2020 by:

_____, Acting Director, Office of Degree Programs
Prisco R. Hernandez, PhD

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the US Army Command and General Staff College or any other government agency. (References to this study should include the foregoing statement.)

Fair use determination or copyright permission has been obtained for the inclusion of pictures, maps, graphics, and any other works incorporated into this manuscript. A work of the US government is not subject to copyright, however further publication or sale of copyrighted images is not permissible.

Abstract

Mastering Operational Art: Russian and Contemporary Understandings to Foster Creativity, by MAJ Augustine H. Paul, 51 pages.

Operational art is a fundamental planning activity that most of the world's Western ground forces study, and aspire to practice, and execute at senior officer levels to ensure that tactical actions on the battlefield reflect strategic logic and purpose. Success is inevitably determined by the achievement of strategic goals and military leaders must effectively develop and manage campaigns that link tactical actions with strategic objectives to fulfill policy level end states. However, the complex nature of operational art is not always fully understood by its practitioners, especially the staff officers. This monograph will address the following core questions: What is operational art? How does systems thinking relate to the employment of operational art in campaign planning and management? What cognitive challenges do senior leaders and their staffs encounter when employing operational art? Operational planners have difficulty employing operational art in the planning and management of combat operations because operational art is not fully understood through a systems thinking perspective which produces the creative thinking required to satisfy strategic aims.

Contents

Acknowledgements	vi
Abbreviations	vii
Introduction: Background.....	1
Statement of the Problem	2
Purpose of the Study.....	3
Significance of the Study.....	3
Theoretical Framework	4
Research Questions and Hypotheses	4
Research Questions	4
Hypotheses	4
Thesis.....	5
Assumptions	5
Limitations.....	5
Delimitations	6
Organization of the Study.....	6
Literature Review	7
What is Operational Art?.....	11
Operational Warfare Involves Simultaneity	15
Operational Art and Distributed Operations.....	17
General Officer Considerations on Operational Art.....	19
Operational Art through Systems Thinking	21
General Theory of Systems	23
Complex Adaptive Systems	26
Creativity	29

T. E. Lawrence: Exploring Strategy and Tactics to Design Unique Operations	31
John Boyd: Framing Change in order to Change	34
Conclusion.....	38
Bibliography	41

Acknowledgements

I would like to thank Dr. Alice Butler-Smith for her continuous encouragement and patience during the research process. I would like to thank COL Meyer for his support and guidance throughout the writing process. I am indebted to my mother COL Jeannette South-Paul (US Army, Ret.) and father Dr. Michael Paul for their encouragement and feedback. I appreciate the assistance of my peers and I am grateful to Mrs. Venita Krueger for her help with formatting.

Abbreviations

CAS	complex adaptive systems
COIN	counter insurgency
LSCO	large scale combat operations
OE	operational environment
OODA	observe, orient, decide and act

Background

Operational art is a fundamental planning activity that most of the world's Western ground forces study, and aspire to practice, and execute at senior officer levels to ensure that tactical actions on the battlefield reflect strategic logic and purpose. Success is inevitably determined by the achievement of strategic goals and military leaders must effectively develop and manage campaigns that link tactical actions with strategic objectives to fulfill policy level end states.¹ However, the complex nature of operational art is not always fully understood by its practitioners, especially the staff officers. Many staff officers spend most of their careers at the tactical level of warfare and are not often groomed to grasp the nuances of the operational function in warfare.² Operational artists are challenged to manage campaigns that mediate between the strategic and tactical realms, merging the art and science of warfare to ensure tactical actions result in strategic success.

The recent US National Security and US Army realignment of focus from counter insurgency (COIN) towards large scale combat operations (LSCO), as well as the identification of the Division as the primary tactical headquarters, illustrates a gap in US Army Theater Armies and Corps organizations' familiarity with operational planning. Historians Justin Kelly and Mike Brennan argue these organizations have not continuously trained and proven their capability on operational art in the LSCO context since the 1991 Iraq War.³ Further challenges confront operational artists such as how warfare as a phenomenon changes qualitatively with the development of different technology over time. These additional challenges highlight that

¹ BG Ret. Huba Wass de Czege, "Thinking and Acting Like an Early Explorer: Operational Art is Not a Level of War," *Small Wars Journal* (14 March 2011), 4, accessed 28 October 2019, <https://smallwarsjournal.com/blog/journal/docs-temp/710-deczege.pdf>.

² Mike Shekleton, "Developing Strategic Leaders," Real Clear Defense, 7 December 2016, accessed, 18 February 2020, https://www.realcleardefense.com/articles/2016/12/07/developing_strategic_leaders_110453.html.

³ Justin Kelly and Mike Brennan, *Alien: How Operational Art Devoured Strategy* (Carlisle, PA: Strategic Studies Institute, 2009), 69.

planning must be conducted while remaining self-aware to maintain cognizance of the operational environment. Planners must be diligent in continuing to evaluate if they are framing problems in context to plan properly. Lastly, updated doctrine and a realignment of focus have highlighted that the primary operational artists are the general officer corps, supported by their operational level staffs. This illustrates the high level of dependence of US Army operational planning success on commanders in a commander-centric approach to planning environment.

Statement of the Problem

Operational planners have difficulty employing operational art in the planning and management of combat operations because operational art is not fully understood through a systems thinking perspective which produces the creative thinking required to satisfy strategic aims. Until the recent update to US Army Field Manual 3-0 *Operations*, the US Army and Joint Forces had separate definitions of operational art causing confusion. The US Joint Forces and western militaries have recognized the need to discuss operational art, the nature of LSCO and challenges in campaigning that deliver strategic aims. However, there are a limited number of recent examples available that illustrate a professional standard for operational art to assist commanders and their staffs in planning campaigns.

Continuous discussion of LSCO by senior leaders and their staffs indicates the potential employment of operational art and assists in developing our understanding of how to properly plan campaigns in a changing world. The US Army transition of focus from 18 years of COIN to LSCO and the lack of personal experience in LSCO at the operational level highlight the importance of further discussions on how leaders frame warfare in the LSCO era.⁴ This study will explore the ways senior leaders understand warfare and how commanders and staffs knowingly or unknowingly perceive and plan campaigns in the emerging LSCO operational environment. The

⁴ Florian L. Waitl, ed., *Into the Breach: Historical Case Studies of Mobility Operations in Large Scale Combat Operations* (Fort Leavenworth, KS: Army University Press, 2018), v-vi.

study seeks to suggest ways for planners to more effectively employ operational art in the wake of COIN campaigns in Afghanistan and Iraq that struggled to achieve lasting strategic aims.

Purpose of the Study

The primary purpose of this study is to determine how senior leaders think about, understand and employ operational art to achieve political and strategic aims. The senior leader paradigm of thought on warfare will be examined to identify if there are any gaps in operational art and its application to campaign planning. The second purpose of the study is to discuss how senior leaders understand operational warfare, explore upcoming challenges and determine gaps between their expectations and the outcomes of the execution of operational art. Twentieth century campaigns and theoretical approaches to operational art will be used to frame the appropriate context of the current challenges facing senior leaders in executing operational art. The study will uncover how senior leaders frame warfare by exploring relevant doctrine, using practical sense making approaches and designing methodologies to fulfill senior leaders' expectations.

Significance of the Study

The following discussion explores what impacts operational art has on successful campaigning. Operational art employed in multi-domain operations can change the focus of the US Army to ensure relevance of planning in future conflict. Despite extensive writing on operational art there has been confusion regarding its true nature, applicability and proper execution. Insights into Russian operational art theory and its evolution can give us a deeper understanding of how we understand warfare and create plans that satisfy political aims. The study will explore how coherent the understanding of planning is at the Theater Army, Corps and Division levels. Discussion will explore whether the US Army's primary emphasis on general

officer execution of operational art could create gaps in our logical approach to operational problem solving.

Theoretical Framework

Current US Joint Forces and US Army doctrine of operational art will form the foundation of the discussion to ensure common understanding of the concept and approach in use at this time. The study will further explore theoretical concepts introduced by BG (Ret.) Shimon Naveh, PhD, T. E. Lawrence, and Frans P. B. Osinga. Later interpretations of the earlier framework and how they were implemented by former US general officers and theorists such as Dr. James Schneider and Joint Staff officers will be discussed. Systemic Operational Design and pertinent concepts will be explored to assist in highlighting operational art's journey in US Army campaigning and facilitate a framework to create effective campaign planning in the future. As many available approaches and theoretical tools will be considered to solve the study's problem.

Research Questions and Hypotheses

Research Questions

1. What is the definition of operational art?
2. How does systems thinking relate to the employment of operational art in campaign planning and management?
3. What cognitive challenges do senior leaders and their staffs encounter when employing operational art?

Hypotheses

The US Army and Joint Forces have experience gaps in their ability to practice operational art stemming from misunderstanding its nature and implementation. They should incorporate systems thinking to successfully implement operational art and link strategic aims and tactical actions. Additionally, the US Army and Joint Forces must acknowledge and refine their

organizational and cultural biases resulting from their COIN experiences to think creatively when planning campaigns.

Thesis

Operational planners have difficulty employing operational art in the planning and management of combat operations because operational art is not fully understood through a systems thinking perspective which produces the creative thinking required to satisfy strategic aims.

Assumptions

The study assumes that there are significant gaps in the employment of operational art based on the writings of military thinkers in the operational planning community. Secondly, the study assumes that the shortfalls in employment of operational art are discoverable and teachable to facilitate improvements in operational level planning by commanders and their staffs.

The study assumes that operational level commanders and their staffs are exerting maximum effort in recognizing the nature of problems and seeking solutions to achieve successful campaign planning. i.e. operational planning is not conducted in a vacuum. Commanders and planners are aware that they must complete the mission within an environment where the tactical actions must achieve the strategic aims.

Limitations

The study is limited to US Forces and Partnering Forces' interpretations of LSCO and will not delve into interpretations of current Russian, Chinese, or Iranian senior leaders' interpretations due to length and accessibility. The study is limited to the interpretations of operational art captured by senior leaders and their staffs and the depth to which they are discussed. For instance, there are several case studies on past interpretations of operational art that can be informative but only apply to a situation at that time.

Delimitations

The study is focused on US Joint Forces and US Army doctrine on the employment of operational art and operational campaign planning to achieve strategic aims. Theories and concepts outside the US military can be discussed to develop solutions to the problem but must be tailored to apply to the unique approach the US military must take in a future LSCO. For instance, an approach that is practical for the militaries of Russia or China, may not be applicable to the US military.

The study is focused on past and future LSCO conflicts and will not delve into non-LSCO campaign planning approaches or concepts. Only non-LSCO planning concepts that have a practical applicability to LSCO will be discussed.

The study will discuss writings and interviews of current and former general officers and staff planners to identify gaps in operational art and determine how senior leaders frame warfare. Non-military theorists and contributors will be considered based on their concepts ability to solve the identified problem.

Organization of the Study

Section 1 includes a brief literature review. Section 2 describes the nature of operational art and includes accredited doctrinal writings, journal contributions, articles, texts, presentations, interviews and perspectives on operational art, and the evolution of operational art theory. Section 3 establishes the importance of systems theory and systems thinking in employing operational art. Section 4 explains the importance of creativity in employing operational art. Section 5 summarizes the historical perspective, the influence of that perspective on current practice, addresses the research questions and hypotheses and draws conclusions. This discussion will inform how the findings can influence current Joint Forces' and the US Army's doctrine and theory as well as proposes further areas of study.

Literature Review

This monograph will use US Joint Forces doctrine, history, military and non-military theorists to develop its hypothesis. Russian theorists initiated the exploration of operational art and form the basis for the study. A. A. Svechin's *Strategy* and G. S. Isserson's *The Evolution of Operational Art* published Soviet doctrinal writings on the concepts of deep battle and "operativnoe iskusstvo" between the First World War and the Second World War.⁵ Isserson and Svechin's writings on operational art's nature and purpose illustrate the practice's connection of the physical and cognitive characteristics of operational warfare and support the hypothesis of the study.⁶

Operational art developed as a solution to the stalemate of positional warfare to restore maneuver to the battlefield. Dr. James Schneider, an Emeritus Professor of Military Theory at the US Army Command and General Staff Officer College and Senior Security Consultant at Booz Allen Hamilton, discusses the advent of the first employment of operational art during the US Civil War in his essay, "Vulcan's Anvil."⁷ He argues that one of the first instances of operational art in combat was during the 23 April 1863, Battle of Chancellorsville in the US Civil War. Schneider's writings on the nature of operational warfare support the explanation of the distributed operations and multidimensional nature of operational art.

Military historian Dr. David Stahel, Senior Lecturer at the University of New South Wales and Military Historian on Nazi Germany, discusses the German Wehrmacht's failed

⁵ Georgii Samoilovich Isserson, *The Evolution of Operational Art*, trans. Bruce W. Menning (Fort Leavenworth, KS: Combat Studies Institute Press, 2013), v; Lt. Col. Wilson C. Blythe Jr., "History of Operational Art," *Military Review* (November-December 2018): 40.

⁶ Alexandr A. Svechin, *Strategy*, ed. Kent D. Lee (Minneapolis, MN: East View Publications, 1992), 69.

⁷ James Schneider, "Vulcan's Anvil: The American Civil War and the Foundations of Operational Art" (Theoretical Paper, SAMS/USACGSC, Fort Leavenworth, KS, 16 June 1992), 16-17.

invasion of Russia and seizure of Moscow in *The Battle for Moscow*.⁸ His writing provides a case study in the challenges to strategic and operational success during operational warfare and supports lessons learned on the practice of operational art. Military Historian Dr. Geoffrey Megargee, a Senior Applied Research Scholar with the Center for Advanced Holocaust Studies, United States Holocaust Memorial Museum, discusses the Wehrmacht leadership's management of the invasion of Russia and attempted seizure of Moscow and describes the consequences of not practicing operational art and employing bias in *Inside Hitler's High Command*.⁹

Israeli Ret. BG Shimon Naveh, a military theorist and founder of Operational Theory Research Institute, National Defense College of Israel, discusses the evolution of operational art and development from Russian, European, and American perspectives in his book, *In Pursuit of Military Excellence: The Evolution of Operational Theory*.¹⁰ His ideas are included to provide context to the theories and characteristics between the Russian and American understanding of operational art.

Scientist Ludwig Von Bertalanffy was an Austrian biologist known as one of the founders of general systems theory of interacting components, applicable to biology, cybernetics and other fields. His *General Systems Theory* is included in this monograph to discuss the function of systems and the applicability of systems theory in multiple circumstances.¹¹ Robert Jervis, Adlai E. Stevenson Professor of International Politics in the Department of Political

⁸ David Stahel, *The Battle for Moscow* (Cambridge, UK: Cambridge University Press, 2015), 246-247.

⁹ Geoffrey P. Megargee, *Inside Hitler's High Command* (Lawrence, KS: University Press of Kansas, 2000), 114-117.

¹⁰ Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory* (London: Frank Cass, 1997), 7.

¹¹ Ludwig Von Bertalanffy, *General System Theory* (New York: George Braziller, 1968), 31.

Science at Columbia University, provides insight into the application of systems theory in security affairs and operational art in *How Systems Work*.¹²

Peter M. Senge, an American systems scientist and senior lecturer at the Massachusetts Institute of Technology Sloan School of Management discusses the importance of employing systems thinking approaches to managing complexity in *The Fifth Discipline*. His ideas are included in this monograph to illustrate that converging diverse functions and talents into a productive whole can assist in managing complex conditions.¹³ Jamshid Gharajedaghi, Professor of Systems Theory at Villanova University, provides insight into systems thinking and the nature of complex adaptive systems in *Systems Thinking*.¹⁴ His writing supports the monograph hypothesis and includes the evolution of systems thinking through information systems, operations research, behavioral sciences, and design thinking in systems theory.

Political scientists Robert Axelrod and Michael D. Cohen's *Harnessing Complexity* supports this study's hypothesis of the importance of systems thinking.¹⁵ Axelrod and Cohen argue that it is possible to improve conditions within systems even though we do not have the ability to fully control the system.

T. E. Lawrence, a British Army officer, archeologist, diplomat, and writer during the First World War, provides an educational perspective and case study into operational level considerations and management of tactical actions in *The Seven Pillars of Wisdom: A Triumph*.¹⁶

¹² Robert Jervis, *How Systems Work: A Perspective on Political and Social Life – Complex Systems: The Role of Interactions* (Princeton, NJ: Princeton University Press, 1997), accessed 5 March 2020, <http://www.dodccrp.org/html4/bibliography/comch03.html>.

¹³ Peter M. Senge, *The Fifth Discipline: The Art and Practice of a Learning Organization* (New York: Random House, Doubleday, 1990), 69.

¹⁴ Jamshid Gharajedaghi, *Systems Thinking: Managing Chaos and Complexity* (Burlington, MA: Morgan Kaufman, 2011), 29.

¹⁵ Robert Axelrod and Michael D. Cohen, *Harnessing Complexity: Organizational Implications of a Scientific Frontier* (New York: Basic Books, 2000), xv.

¹⁶ T. E. Lawrence, *Seven Pillars of Wisdom: A Triumph* (New York: Anchor Books, 1991), 192.

His writings are discussed in this monograph because they clearly articulate the way operational artists must consider the system of warfare and conduct operational level planning.

John Boyd, a US Air Force pilot, military theorist, and Pentagon consultant, studied theories of warfare, application of chaos and complexity theory to warfare and the nature of decision making. His ideas in *Destruction and Creation* support the hypothesis of the monograph illustrating the challenges leaders face to identify the system and generate a contextually useful understanding—or reframe—challenges to achieve goals.¹⁷ Boyd’s ideas are discussed in the monograph because they support the hypothesis that systems thinking enables creative thought, improving decision making, and facilitating successful campaign planning.

Frans P. B. Osinga further discusses Boyd’s strategic and operational theories in *Science, Strategy and War: The Strategic Theory of John Boyd*.¹⁸ Osinga is a Royal Netherlands Air Force pilot and Netherlands Ministry of Defense Senior Research Fellow at the Clingendael Institute of International Relations at the Hague. His writings are included in the monograph because they explain John Boyd’s theories of warfare, observation and creativity, and their application to operational art.

Michael Arena, a speaker, author on adaptivity, and the Vice President for Talent Management and Development at Amazon Web Services, argues the importance of adaptivity in organizations in *Adaptive Space*.¹⁹ His ideas are included in this monograph because they support the hypothesis that military organizations that enable creative thinking, foster proactive and effective solutions to complex challenges. For instance, Arena’s ideas that creativity and invention are products of collaboration highlight that creativity is a complex social process.

¹⁷ John Boyd, *Destruction and Creation*, 3 September 1976, accessed 6 December 2019, http://www.chetrichards.com/modern_business_strategy/boyd/destruction/destruction_and_creation.htm, 1.

¹⁸ Frans P. B. Osinga, *Science, Strategy and War: The Strategic Theory of John Boyd* (New York: Routledge, 2007), 54.

¹⁹ Michael J. Arena, *Adaptive Space: How GM and Other Companies are Positively Disrupting Themselves and Transforming into Agile Organizations* (New York: McGraw-Hill, 2018), 11.

What is Operational Art?

This section describes the US Joint Forces definition of operational art and the lack of detailed explanation on its nature in doctrine; and explains how operational art is critical to military planning. The US Army and Joint Forces have experience gaps in their ability to practice operational art stemming from misunderstanding its nature and implementation. Analysis of the doctrinal and deeper understandings of operational art will support the study's hypothesis and set a foundation for discussion on the necessity for systems thinking in operational planning.

JP 5-0, *Joint Planning* and ADP 3-0, *Operations* define operational art as “the cognitive approach by commanders and staffs—supported by their skill, knowledge, experience, creativity, and judgment—to develop strategies, campaigns, and operations to organize and employ military forces by integrating ends, ways, and means.”²⁰ The goal is to synthesize strategic guidance, while simultaneously managing tactical operations in dynamic circumstances to achieve strategic end states. Operational art is vital to mission success because the practice enables commanders and their staffs to develop an operational approach which allows “broad strategic and operational concepts to be translated into specific missions, tasks and an executable plan.”²¹

US Joint Forces doctrine describes, but only briefly explains, the elements of operational art. These elements serve as tools for commanders and their staffs to manage tactical actions throughout campaigns by organizing large amounts of data into useful information in order to develop an operational approach.²² Commanders and their staffs use intellectual tools to undertake conceptual and detailed planning “to help them communicate a common vision of the

²⁰ US Department of Defense, Joint Staff, Joint Publication (JP) 5-0, *Joint Planning* (Washington, DC: Government Printing Office, 2011), IV-1; US Department of the Army, Army Doctrinal Publication (ADP) 3-0, *Operations* (Washington, DC: Government Printing Office, 2019), 2-1.

²¹ Joint Staff, JP 5-0 (2011), xxi.

²² *Ibid.*, IV-5.

operational environment as well as visualizing and describing the operational approach.”²³ The US Army discusses the elements of operational art in more specificity compared to Joint Doctrine, identifying them as end state and conditions, center of gravity, decisive points, lines of effort and lines of operations, operational reach, basing, tempo, phasing and transitions, culmination and risk.²⁴ Not all elements may be of equal concern throughout operations, but the awareness of the elements is intended to help planners to think about operational warfare without explaining how to necessarily recognize or employ them. The elements are crucial to the practice of operational art because they enable senior leaders and their staffs to think about the physical and non-physical domains of warfare simultaneously to create conditions in the operational environment that lead to fulfillment of operational and strategic aims.

There is comparatively minimal explanation of the nature of operational art and how generals and their staffs must perform it in doctrine. The lack of explanation of operational art’s nature, what it is and how to practice it, forces generals and their staffs to interpret the meaning of operational art from limited explanations. For instance, JP 5-0, *Joint Planning* describes operational art in detail for one and a half pages and FM 3-0, *Operations* for less than one page.²⁵ Conversely doctrine focuses more on tactical concepts instead of exploration into how planners must think about how they think about warfare. Numerous manuals discuss the details of tactical level tasks such as infantry tactics, reconnaissance and security operations and airborne operations but neglect teaching generals and their staffs how to ensure they are ordering forces to conduct the appropriate tactical tasks to deliver the desired end state.²⁶ Doctrine omits

²³ US Department of the Army, Army Doctrine Reference Publication (ADRP) 5-0, *The Operations Process* (Washington, DC: Government Printing Office, 2012), 2-4.

²⁴ Ibid.

²⁵ US Department of the Army, Field Manual (FM) 3-0, *Operations* (Washington, DC: Government Printing Office, 2017), 1-19-1-20; Joint Staff, JP 5-0 (2011), IV-4-IV-5.

²⁶ US Department of the Army, Field Manual (FM) 3-21.8 (FM 7-8), *Infantry Rifle Platoon and Squad* (Washington, DC: Government Printing Office, 2007); US Department of the Army, Field Manual (FM) 3-90-2, *Reconnaissance, Security and Tactical Enabling Tasks* (Washington, DC: Government

explanation on how generals and their staffs think about or understand the enemy in context as part of the desired end state.

This monograph asserts that there are additional explanations that should be included in doctrine to clarify the essential requirements of commander and staffs in its execution. Russian theorists provide a more comprehensive understanding of operational art and identify characteristics that doctrine does not sufficiently explain such as the arrangement of military forces, the systemic nature of the operational environment, and simultaneous distributed operations. Discussing Russian theorists' ideas is important because it can enhance our understanding of operational art, since US Joint Forces doctrine does not adequately explain these characteristics of operational art to a degree that assists generals and their staffs. Furthermore, discussing Russian theorists' ideas is important because Russian operational art theory inspired the US military to acknowledge operational art and study the practice.

Soviet military theorist, A. A. Svechin, who first applied the term “operational art” or “operativnoe iskussivo,” stressed the importance of arrangement of forces and defined operational art as

the bridge between tactics and strategy, the means by which the senior commander transformed a series of tactical successes into operational “bounds” linked together by the commander’s intent and plan and contributing to strategic success in a given theater of military actions . . . the totality of maneuvers and battles in a given part of a theater of military action directed toward the achievement of the common goal, set as final in the given period of the campaign.²⁷

Svechin’s analysis of operational art is important because he highlights the multiple dimensions of operational warfare.²⁸ Their study of operational shock provides an effective perspective of the operational level of war as a system which can be exploited and manipulated.

Printing Office, 2013); US Department of the Army, Field Manual (FM) 90-26, *Airborne Operations* (Washington, DC: Government Printing Office, 1990).

²⁷ Svechin, *Strategy*, 23, 38. Arrangement concerns ensuring the correct military forces are at the appropriate location during conflict to achieve the immediate and follow on military and political end states.

²⁸ Isserson, *The Evolution of Operational Art*, 42, 55.

The systemic nature of operational art highlights a paradigm shift from simpler positional warfare to operational war of industrialized forces, where concepts of depth, continuity, synergism, and wholeness led to a required change in how leaders understand modern warfare.²⁹ Similarly, Isserson implied the systemic characteristic of operational art when he discussed generals' tendency to focus on the quantifiable tactical components of warfare and avoid understanding operational warfare's operational and strategic nature. He referred to the focus on tactical components as the fallacy of genetic composition.³⁰ Isserson's insights into operational art are important because they illustrate how generals during his time failed to achieve operational success because they were focused on tactics and ignorant of the systemic nature of operational level warfare.

Isserson's writings on composition further support the argument that operational art is inherently systemic in nature. Isserson discussed the concept of the logical fallacy of composition, which was "a false belief that what is true of our tactical past will hold true of our expanded operational and even strategic future."³¹ He highlighted how generals were tactically biased and could not see past the tactical level of warfare up to the First World War because of four primary reasons: (1) generals logically structured the world based on how they saw and imagined it, (2) generals were educated to see warfare in clearly defined levels and structures, (3) generals led through direct "heroic" leadership (providing purpose, motivation and direction directly to their forces) and lastly, (4) classical era militaries experienced anti-intellectual culture within military institutions assaulting innovative thought.³² The fixed thinking of Russian

²⁹ Naveh, *In Pursuit of Military Excellence*, 11.

³⁰ Isserson, *The Evolution of Operational Art*, xi. Isserson implied the systemic characteristic of operational art when describing generals' tendency to "paper over their ignorance of the operational and strategic whole by defining it in terms of the known and tangible remnants of the tactical parts. In contrast, Soviet theorists came to realize that operational art was a way of thinking designed to overcome the fallacy of genetic composition—the tendency to structure cognitively the whole of warfare from the sum of its individual tactical parts."

³¹ *Ibid.*, xi.

³² *Ibid.*, x-xii.

theorists resulted in an interpretation of warfare throughout its vertical and horizontal depth among numerous other variables previous military leaders did not have to consider during the pre-industrialized classical era of warfare.³³

Generals and their staffs must understand the systemic nature of operational warfare to effectively perform operational art. Isserson's analysis of operational level war highlights the required perspective planners must have when approaching combat operations. His analysis is important because it directs generals and their staffs to view the operational environment as a system where there is integration of variables in an environment, at the tactical and operational levels where both physical and cognitive qualities interact, and where the collection of actions in the environment can have different effects compared to when they are in isolation. Operational art is inherently systemic in nature as it considers the operational environment holistically, as a conglomerate of numerous variables that interact in different ways between one another.

Operational Warfare Involves Simultaneity

The practice of operational art requires understanding of the simultaneity of tactical operations. For the Russian theorists, simultaneity is demonstrated by an operational form that engaged the enemy's front and rear of system at the same time, while synchronizing a concurrent operation along the enemy's depth to disintegrate the enemy system.³⁴ Operations would seek to overwhelm the enemy's cognitive system and the interaction of its elements. The successful overwhelming of the enemy cognitive system would induce the concept of operational shock or "udar" which was when successive operations were conducted to shock the rival forces' system achieving a tactical breakthrough into an operational breakout.³⁵

³³ Isserson, *The Evolution of Operational Art*, xvii- xix.

³⁴ Naveh, *In Pursuit of Military Excellence*, 18.

³⁵ *Ibid.*, 166.

The Russian theorists' concept of operational art understood multiple concurrent operations to defeat the enemy. Tukhachevskii and other members of the Russian operational school constructed groupings of armored and mechanized formations that were organized behind a holding force with the specific purpose to develop a breakthrough into the enemy's lines. Simultaneity is important to the planning and management of campaigns because planners must think through operations, constantly thinking ahead of current events as a result of multiple tactical operations occurring concurrently. The Russian theorists' ideas on simultaneity are important because they advocated multiple confrontations with the enemy compared to classical era's tendency to seek out one decisive confrontation. The theorists studied the US Civil War and learned from Union and Confederate generals' ineffectiveness at seeking one decisive confrontation which developed the operational level of warfare and practice of operational art.

Russian theorists' ideas on simultaneity in operational art are important because planners cannot simply focus on one tactical task at a time but must be comfortable managing multiple concurrent tactical operations in the enemy's depth which defines campaign management at the operational level. Simultaneity of multiple tactical missions at different echelons requires that generals and their staffs manage different operations concurrently, that they function smoothly and effectively in relation to each other in time and space for specific purposes.³⁶

Planners cannot simply be aware of simultaneity but must become masters at the management of multiple simultaneous tactical actions which enables commanders to affect the enemy and operational environment in a systemic manner, to induce operational shock. The concept of simultaneity and inflicting operational shock requires generals and their staffs think differently about warfare compared to the purely tactical level of the classical era and deliberately consider effects induced on the enemy from an operational perspective. Russian theorists explain

³⁶ Naveh, *In Pursuit of Military Excellence*, 187, 190.

the simultaneity of operational warfare to a deeper extent than US Joint Forces doctrine which can improve understanding and performance of operational art.³⁷

Operational Art and Distributed Operations

Operational art is characterized by deep distributed operations instead of the classical requirement for concentration of forces. Russian theorists studied the US Civil War during their formulation of ideas on operational art. Schneider provides exceptional insight into the operational characteristic of distributed operations and how its advent created the need for operational art. From the time of Alexander the Great of Macedonia to the Napoleonic Wars, the classical form of warfare was concentrated battle, where one army would seek to move their forces on the same battlefield as an enemy army, and through the use of concentration of forces at the enemy's weakest point, to defeat the adversary.³⁸

However, warfare expanded to the operational level as a result of the Industrial Revolution and advances in technology that introduced one million soldier strong armies, the telegraph, railroads and advanced weaponry throughout larger territories. Multiple armies would conduct concurrent operations in distributed operations to defeat the enemy which could utilize the totality of the national resources from an industrialized age. Schneider argues that

...operational art is characterized by the employment of forces in deep distributed operations . . . with simultaneous and successive operations, thoroughly integrated by a means of distributed communication, was therefore alien to the Napoleonic style of warfare and its precursors.³⁹

Distributed operations is important because it enables the operational armies to gain and maintain freedom of action in time and space for the common aim of maintaining or denying the enemy freedom of action instead of the classical strategy of maneuver to gain positional

³⁷ Naveh, *In Pursuit of Military Excellence*, 184-185.

³⁸ Schneider, "Vulcan's Anvil," 20.

³⁹ *Ibid.*, 28.

advantage or annihilate the enemy army.⁴⁰ Where classical warfare armies could destroy the enemy in a single decisive confrontation, the operational armies were harder to destroy in one battle. Distributed operations changed the classical paradigm of warfare because it was based on providing operational leaders options instead of classical strategy's focus on decisive battle. In the same way, generals and their staffs must deliberately coordinate distributed tactical operations to create options for commanders and minimize risk.

Distributed operations are an inherent characteristic of operational art and consist of multiple components. These components include: (1) extended maneuver and deep battle, instead of concentric maneuver and concentrated battle, (2) continuous logistics, (3) distributed enemy, and (4) distributed deployment. During the classical period of warfare, armies conducted maneuver to gain a position of relative advantage to destroy the enemy in decisive battle. Conversely, the operational era of warfare involved the maneuver of armies to maximize the flow of force in tempo and density and to facilitate the relational movement in depth to maximize freedom of action for the destruction of the enemy's capacity to wage war.⁴¹ The differences in purposes of maneuver between the classical and operational eras are important because they highlight the changed nature of the warfare since the US Civil War (1861 to 1865) and how distributed operations are a key characteristic of operational art.

The Russian theorists' writings on operational art inform the argument and support this study's hypothesis because they explain the nature of operational art and can assist generals and their staffs in employing the practice in campaign planning. Operational art demonstrates a distinctly different and more complex nature from the classical form of positional warfare that preceded it. Operational art has unique characteristics that Joint Forces doctrine could explain more thoroughly to help senior leaders and planners to appreciate operational warfare's

⁴⁰ Schneider, "Vulcan's Anvil," 35.

⁴¹ Ibid., 31.

complexity. The key characteristics of operational art are the doctrinal elements of operational art, the systemic nature of operational art, simultaneity and distributed operations. These natural characteristics are important because they represent a paradigm shift from warfare where nation state leaders could lead their army and command it personally, to an expanded form of operational warfare of systemic distributed operations throughout the horizontal and vertical depth of multiple battlefields.

General Officer Considerations on Operational Art

Adding to the challenges of employing operational art are the realities of the fourth domain, of time. The thorough understanding of operational art, viewing the battlefield through the lens of systems theory with creative thinking and self-awareness must be conducted under the ominous pressure of time and its constraints. Planners must manage shorter decision-making cycles within longer strategic decision-making cycles. Wass de Czege writes that because

...a “campaign” is any extended military endeavor involving many thinking and interacting human beings in competition, in alliance, or neither, operational art (or campaigning) is really a matter of managing shorter tactical decision cycle within longer strategic decision cycles.⁴²

Wass de Czege supports this when he writes that generals and their staffs should have in mind a decision cycle for periodic updates to strategy because we should “expect strategies to expire as circumstances change, and thus cause tactics to become irrelevant to strategic progress.”⁴³ Furthermore, at the heart of operational art is the general and staff’s ability to perform the operations process and further develop their understanding of the operational environment and the mission situation. As a result of our habitual behavior of thinking and

⁴² BG Huba Wass de Czege, Ret. USA, “Why “campaigning” and operational art is a matter of managing shorter Tactical Decision Cycles within longer Strategic Decision Cycles,” Interview Response Fort Leavenworth, KS, 7 February 2020, 16.

⁴³ Ibid., 17.

learning episodically at the strategic and operational levels, leaders learn far too slowly that what they initially thought they knew was wrong or no longer relevant. de Czege argues that leaders’

...registering of success against concrete objectives is too reassuring. And the inevitable first clues to the failure of the strategic rationale needs to swim upstream against the current of strongly held preconceived beliefs. Also, leaders ask the wrong questions of intelligence sources—they rarely ask, “prove to us that our strategic thinking is wrong.”⁴⁴

Generals and their staffs must adopt strategic learning and decision-making cycles throughout their employment of operational art “to sense what changed in the situation as a result of these actions. Did the tactical results advance the strategic cause? Did the enemy, allies, and “neutrals” react as intended and predicted? Did the actions to develop the situation provide new understanding? In what way were the command’s theories wrong about how the “mission world” works and how to “advance?” Is there un-exploited potential within the situation for a wiser strategy?”⁴⁵ de Czege stresses that generals and their staffs must deliberately ask themselves such questions throughout operations to ensure they are employing effective decision-making cycles to further their understanding and address the numerous challenges in a constantly evolving operational environment.

More recently Gen. Franks in a personal interview also emphasized his vision for operational art and the importance of considering four key factors that impact operational art today (1) the involvement of external agencies; (2) the speed with which modern conflict moves limiting time for reflection and reframing strategy; (3) the urgency of narrowing the focus on one or two key objectives to preserve forward momentum—e.g. preventing Afghanistan from becoming a crucible for launching worldwide terrorism again; and (4) the need to train leaders at multiple levels—not just the general officers—to understand and employ operational art in a real-time environment.⁴⁶

⁴⁴ BG Huba Wass de Czege, Ret. USA, Interview Response, 17.

⁴⁵ Ibid., 18.

⁴⁶ Gen. Fred Franks, Ret. USA, Interview Response, Fort Leavenworth, KS, 4 March 2020.

General officers' considerations highlight the importance of taking note of how time affects decision making. Generals and their staffs must understand time factors at the multiple levels of warfare and how the time factors can differ between the tactical and strategic levels. Furthermore, leaders must consider when decisions must be made and ask "when do I have to decide? Is that date time group to decide likely to change?" Operational art concerns the management of multiple factors simultaneously in time, space, and purpose and requires continuous assessment of opportunities, risk, and resources.

The considerations of de Czege and Franks are important to the discussion of the monograph for two primary reasons: they present the theoretical link of our understanding of operational art from the Russian theorists to the present. Secondly, Franks' considerations illustrate the deeper understanding and nature of operational art and its application during the United States' engagement in LSCO during Operation Desert Storm. The general officers' considerations support the thesis and set the foundation for the following section's discussion on the importance of systems thinking.

Operational Art through Systems Thinking

After defining the nature of operational art and its fundamental characteristics, it is now possible to examine how systems thinking is relevant to its employment. This section serves to discuss systems theory and its function as a cognitive enabler for operational art. This section will discuss the US Joint Forces definition of systems thinking and will then explore the characteristics of systems thinking to help elucidate for commanders and their staffs what is meant by doctrinal references to systems thinking and how it is essential to the practice of operational art.

The evaluation of the primary characteristics of systems theory is also crucial to a deeper understanding of the function of operational art and compliments the analysis of operational art's nature in the previous section. An analysis of the characteristics of systems thinking is important

because it uncovers the relationship between the cognitive and the practical—or artistic and scientific qualities of operational art. This section serves to highlight how systems thinking is vital to generals and their staffs’ performance of operational art.

Operational art is inherently the product of the tension between art and science and is understood best from the perspective of systems theory. Military operations must manage multiple variables concurrently—and in a context that is defined by both the quantitative and the qualitative. JP 2-01.3, *Joint Intelligence Preparation of the Operational Environment* advocates that planners employ a systems perspective to understand the operational environment.⁴⁷ Systems perspectives are important for US Joint Forces planners because they require planners to consider the quality of relationships between variables in systems to fully understand the operational environment (OE) as well as the physical variables themselves. ATP 5-0.1, *Army Design*

Methodology defines systems thinking as

...a process of understanding how parts of a system work and influence each other as part of a greater whole. It is an approach to problem solving that views problems as part of the greater system and that these problems are interrelated. By understanding components and problems in a system in relation with each other - as opposed to in isolation or in categories according to likeness, problem solvers are better equipped to develop a holistic approach to solving or managing identified problems.⁴⁸

Generals and their staffs must manage variables within the complex system of the battlefield to achieve victory. A deeper discussion on the function of systems thinking supports the hypothesis and argument that systems thinking assists the practice of operational art. Systems thinking is comprised of the general theory of systems, chaos theory, complexity theory, and the principles of complex adaptive systems. An understanding of these characteristics highlight how

⁴⁷ US Department of Defense, Joint Staff, Joint Publication (JP) 2-01.3, *Joint Intelligence Preparation of the Operational Environment* (Washington, DC: Government Printing Office, 2014), I-4. Systems perspective is important to understand the “significant relationships and interdependencies within and between interrelated political, military, economic, social, information and infrastructure (PMESII) and other systems relevant to a specific joint operation . . . to enable understanding of the conditions within the operational environment (OE) that directly impact current functionality advantageous for friendly, adversary, or other decision makers and their decision-making processes.”

⁴⁸ US Department of the Army, Army Techniques Publication (ATP) 5-0.1, *Army Design Methodology* (Washington, DC: Government Printing Office, 2015), 1-7.

individuals and organizations can solve difficult problems by seeing and thinking holistically. Systems thinking characteristics function according to the natural characteristics of operational art as already discussed.

Systems thinking is important because it enables generals and their staffs to manage the complexity of operational warfare. In the military context, when generals and their staffs view the OE as a complex adaptive system, they appreciate conflict's chaotic and complex characteristics. A systems perspective enables them to exploit their knowledge of the structure of the system to change the system as opposed to relying on chance, luck or fortune to achieve mission success.

General Theory of Systems

Modern systems theory began in 1968 with scientist Bertalanffy's *General System Theory*, which sought to prove that wholes were not the linear aggregate of component parts but were more than the sum of individual parts and at the mercy of dynamic laws.⁴⁹ Bertalanffy found that interactions between component parts varied in character from when they were in isolation or in relation to others which is analogous to the operational environment generals and their staffs must contend with during conflict

it is necessary to study not only parts and processes in isolation but also to solve the decisive problems found in the organization and order unifying them, resulting from dynamic interaction of parts and making the behavior of parts different when studied in isolation or within the whole.⁵⁰

His approach to determining the nature of interactions and relationships between actors is important because it focuses on wholes rather than parts. Generals and their staffs can adopt this approach to understand at an operational level how tactical variables' interaction in the operational environment are interrelated and how together they create something different from

⁴⁹ Bertalanffy, *General System Theory*, 31.

⁵⁰ Ibid.

the sum of the parts. Ultimately generals and their staffs can see how this understanding has a bearing on mission success.

Bertalanffy's study also discussed the nature of open and closed systems throughout physics, which developed our understanding of systems theory. Closed systems concern systems that are isolated from their environment and cannot be affected from the outside.⁵¹ Conversely, open systems are seen as living systems, which are open to information and activity and, as a result, are constantly changing—never remaining in equilibrium or a “steady state.”⁵² This acceptance of the nature of living systems sets the foundation of our understanding of the operational environment is challenging because it is at relative odds with the logic of tactics, but it enables generals and their staffs to practice operational art when considering warfare as living, dynamic and continuously active.

Bertalanffy's studies on systems are useful in developing a framework to assess whether a system is operationally active and determining the logic of the different variables within the system, the purpose of the system and emergent properties.⁵³ His insights are important because they highlight a process for understanding systems staffs can use during campaign planning. His application of system theory to multiple disciplines provides tools to understand complexity which supports this study's hypothesis.

Naveh's considerations of Bertalanffy shows the systemic nature of operational art and how a system reflects a tension between strategic and tactical actions to achieve higher goals. Naveh outlined Bertalanffy's systems research to develop a theoretical framework to assess operational warfare by scientific and critical criteria.⁵⁴ The criteria provide an alternate and more

⁵¹ Bertalanffy, *General System Theory*, 39.

⁵² Ibid.

⁵³ Ibid., 34-36.

⁵⁴ Naveh, *In Pursuit of Military Excellence*, 2006, 13-14. According to Naveh, a system is defined as active if and only if it responds positively to specific criteria. First, a system reflects the cognitive tension between general orientation towards the strategic aim and the adherence to tactical missions which implies that the system conducts a collection of actions at a lower echelon to serve a grander and more

detailed understanding of the operational environment and nature of complex adaptive systems compared to linear and one-dimensional comprehensions.

These systems approaches can be applied to the complex problems generals and their staffs encounter during operational level planning. The political scientist Robert Jervis writes extensively on the characteristics of systems and highlights Bertalanffy's ideas on systems in their application to social, political and military affairs. Jervis notes that we encounter systems when "(a) a set of units or elements are inter-connected so that changes in some elements or their relations produce changes in other parts of the system and (b) the entire system exhibits properties and behaviors that are different from those of the parts."⁵⁵ This is different from the concept of linearity where "(1) changes in system output are proportional to changes in input . . . and (2) system outputs corresponding to the sum of two inputs are equal to the sum of the outputs arising from the individual inputs."⁵⁶

Furthermore, Jervis emphasizes that systems display non-linear relationships. Recognition of this system principle helps commanders and staffs when they think about the consequences of their actions when performing operational art—output is not equal to input but rather consequences are multiple, inter-related and non-linear, they produce emergence/new patterns, where outcomes cannot be understood by adding together the units or their relations and

holistic purpose. Second, a system is based upon Luttwak's concept of industrious maneuver expressing relationship between general action and strategic aim, which expands on the previous criteria's qualities at a micro level. Third, the planned actions within the system are synergetic where the output of the actions are greater than the arithmetic sum of its parts, alluding to the emergent properties of the system. Fourth, in the military context, the system actions within the system aim to disrupt the opponent's system. Fifth, the system reflects a contemplative attitude towards factor of randomness expressing chaotic dimension between contentious systems which highlights the system's awareness of counter intuitive behavior and operation between variables. Sixth, the system has a non-linear nature where the change in the input is not proportional to the change in the outputs. Seventh, the system reflects deliberate interaction between concepts of maneuver and attrition, illustrating an understanding of erosion, the desire to wear down and defeat the enemy system's functions and purpose to achieve the strategic aims. Lastly, a system is a completely independent entity requiring recognition of its autonomous state and is relatable to a broader universal theory

⁵⁵ Jervis, *How Systems Work*.

⁵⁶ *Ibid.*, 1.

many of the results of the actions are unintended. Systems are characterized by complexity in the simplest interactions and that the effects of interactions perpetuate throughout the system for long periods of time afterwards. The importance of Jervis' analysis is his application of systems theory to human interaction in security affairs and the level of non-linearity and fluidity present in systems. Peter N. Senge supports this when he writes that systems thinking

...is needed more than ever because we are being overwhelmed by complexity . . . organizations break down despite individual brilliance and innovative products because they are unable to pull their diverse functions and talents into a productive whole . . . systems thinking is a discipline for seeing the structures that underlie complex situations . . . a shift of mind from seeing parts to wholes . . . from reacting to the present to creating the future.⁵⁷

The combination of an understanding of chaos and complexity theories provide a deeper understanding of the functions of systems thinking and their employment during operational art.⁵⁸

Complex Adaptive Systems

Understanding complex adaptive systems (CAS) enhances generals and their staffs' abilities to manage complex situations because it changes their understanding of the world and the way warfare is viewed which enables generals and their staffs to effectively manage operational level conflict. Generals and their staffs' employment of systems thinking requires non-linear thinking to address the challenges of complexity in conflict. Thus, systems thinking is ideal for performing operational art during campaign planning. Axelrod and Cohen support this when they advocate the use of systems thinking and the complex adaptive system approach to managing or "harnessing" complexity in the world.⁵⁹ Axelrod and Cohen argue that it is possible to improve conditions within systems even though we do not have the ability to fully control the

⁵⁷ Senge, *The Fifth Discipline*, 69.

⁵⁸ Axelrod and Cohen, *Harnessing Complexity*, xv. Axelrod and Cohen write that chaos differs from complexity because "chaos deals with situations such as turbulence that rapidly become highly disordered and unmanageable. On the other hand, complexity deals with systems composed of many interacting agents. While complex systems may be hard to predict, they may also have a good deal of structure and permit improvement by thoughtful prevention."

⁵⁹ Axelrod and Cohen, *Harnessing Complexity*, xvi.

system. They advocate that the CAS approach enables actors to influence systems by defining who the actors are within the system, what they can see and do, how they behave, how they interact with other actors and variables, and whether their strategies are selected for retention, amplification or extinction.

General systems theory, chaos and complexity theory set the foundation for the principles of complex adaptive systems which must be understood to perform systems thinking. Systems theory and the principles of complex adaptive systems illustrate the function of living systems and assist generals and their staffs in seeing the operational environment from an operational level, as a dynamic and constantly changing whole. The five principles of complex adaptive systems are openness, purposefulness, counter intuitiveness, multidimensionality, and emergent property.⁶⁰

The five principles of complex adaptive systems develop our understanding of the function of operational art, just as the characteristics of operational art educate us on the nature of operational warfare. Doctrine thinks in terms of form follows function. Function directly influences form to complete given tasks. This is not a useful or singular understanding that can serve the generals and their staffs. If they are functioning in a complex, evolving, and non-linear world, then strategy is not found in form follows function, but in continually framing an understanding of the evolving, changing whole context—and using that understanding to define the operational form that will be most efficaciously designed and applied to the enemy in context. The idea that form follows function only addresses the “how” of operational function of warfare. The frame of “why” is the qualitative component of operational art and provides the organization logic for “how”—the arrangement and application of forces in conflict.

Gharajedaghi’s discussion of the principles of complex adaptive systems applied to an operational context provide a different insight than the norm and more thorough understanding of

⁶⁰ Gharajedaghi, *Systems Thinking*, 29.

the operational environment enabling effective employment of operational art. The openness of living systems can only be understood in the context of their own environments and the knowledge that actors should seek to influence what they cannot control and appreciate what one cannot influence.⁶¹ Systems are the context. Variables within the system are interrelated, in context. The object of a systems view is what one can and cannot influence and control. This is because systems theory teaches that we cannot control a CAS, and this is important because generals and their staffs use a deeper understanding of how CAS functions to change the CAS to reflect the desired future state.⁶² One can identify relevant action toward systemic transformation—not destruction of the things in it we do not like or the false idea that we can control what we wish.

The complex realities of open systems present a more appropriate approach to managing warfare's realities because the OE is dynamic, constantly changing and adheres to the principles of systems theory.⁶³ Each of the principles of systems theory are applicable to the system of the OE. Furthermore, systems thinking facilitates better appreciation of risk in conflict. Systems and the battlefield are purposeful, and value guided, enabling generals and staffs to use the constructs of rationality, emotion and culture to assess the critical factor of risk. Systems thinking and recognition of the purposefulness of the OE as a system is important because it means that generals and staffs can manipulate systems to create desired conditions if they possess a thorough understanding of the system. Discussion of the influence of the Russian theorists' understanding of operational art and its systemic nature complements the evolution of contemporary research studies on systems thinking to educate generals and their staffs on operational art.

⁶¹ Gharajedaghi, *Systems Thinking*, 31.

⁶² *Ibid.*, 32.

⁶³ *Ibid.*, 33.

Creativity

Creativity is important for successfully implementing operational art through the lens of system theory and it is the product, or consequence of operational thinking. Creativity embodies the ability to design novel/unique operations that are applicable to a changing/learning enemy during campaign planning. The section builds on the discoveries of previous sections: that planners must understand operational warfare and art and see operational warfare through a system thinking lens during planning. Planners who think creatively can manage the physical realm of war at the tactical level, as well as manage the cognitive realm at the strategic level. This section will discuss the limited doctrinal guidance on creativity, use theorists such as Lawrence and Boyd to illuminate the importance of creative thinking, and describe how creative capabilities were a necessary element of the counterinsurgency battles that have dominated the last two decades.

Creativity facilitates innovative campaign planning to solve unfamiliar problems or existing problems under different conditions in the OE. Generals and their staffs are required to fully understand their operational environment, envision a desired future state and develop scientific and artful operational approaches to bring the future desired state into reality. Effective manipulation of the variables in the system of the OE requires a thorough understanding of the variables in the OE, as well as creative thought to manipulate those variables to a desired state.

What does doctrine tell users about creative thinking and design? Doctrine provides information on the intent of creative thinking without defining it. Army Technical Publication 5-0.1, *Army Design Methodology* discusses creative thinking for two paragraphs and describes it as “examining problems from a fresh perspective to develop innovative solutions.”⁶⁴ Army doctrine describes what creative thinking does but does not discuss what it is or how to do it. This

⁶⁴ US Army, ATP 5-0.1 (2015), 1-6.

is important because the lack of clarification on how to develop and employ creative thinking means generals and their staffs must assume shared understanding on what creativity is and what it looks like among multiple non-doctrinal definitions. Without knowledge, generals and their staffs would keep doing the same things. Furthermore, doctrine takes risks when it requires the use of creativity but assumes creative thinking can routinely occur under the challenging conditions of conflict.

The US Army published Army Technical Publication 5-0.1, *Army Design Methodology* to introduce design thinking into doctrine and facilitate commanders and their staffs' creative thinking capabilities to solve challenging and unfamiliar problems. ATP 5-0.1 defines Army design methodology as “a methodology for applying critical and creative thinking to understand, visualize, and describe unfamiliar problems and approaches to solving them.”⁶⁵ Design thinking within the US Army and Joint Forces allows commanders and their staffs to better understand their operational environment so they can more effectively conduct conceptual planning and decision making. Design thinking can be done in numerous ways and is a non-linear process as opposed to linear processes like the US Army's military decision-making process. This means that to employ design thinking, generals and their staffs must repeatedly evaluate and reframe their understanding of the OE instead of conducting a structured sequence of behaviors. Commanders and their staffs must employ conceptual planning to best understand their operational environment, determine what the problem is, avoid focusing on the symptoms, and determine what needs to be done and why, to develop a broad approach to solving the correct problems. Creative thinking is most critical during the development of the broad approach to solving the operational problem—or military strategy as an operational concept.

⁶⁵ US Army, ATP 5-0.1 (2015), 1-3.

T. E. Lawrence: Exploring Strategy and Tactics to Design Unique Operations

Although doctrine describes what must be done to undertake conceptual and detailed planning, doctrine fails to go into enough detail discussing how to think creatively to solve problems. Lawrence's writings in Chapter 33 of *The Seven Pillars of Wisdom* provide an informative exploration in the creative thought process to develop an operational approach during a campaign. Lawrence's writings provide an educational perspective into operational level considerations and management of tactical actions to achieve grander strategic goals. Lawrence's insights are important because he highlights the need to apply a creative mind to problems and interpret warfare by managing different elements that effect operational level warfare to gain relative advantage over the enemy. His thought process describes how planners must affect the enemy by understanding their OE and determine how to change the system through creative and reflective thought.

Lawrence viewed the OE of the Arab-Turkish confrontation in the desert of what is now southern Jordan, during First World War as a system composed of variables and used creative thinking to reframe how he saw the system and manipulate its variables to defeat the Turks. Lawrence saw the OE as the combination of physical and non-physical characteristics of time, space, purpose, risk, opportunities and resources. The application of creativity in conjunction with a systems approach and operational level planning enabled Lawrence to see the battlefield from an alternate view to develop a novel solution to a complex problem. Lawrence effectively uncovers the physical and non-material elements of the operational realm of warfare, just as Naveh discusses a century later, reflecting that the Arab operational approach is cognitive in evaluation and desires to use physical actions to alter enemy perspectives and actions. Lawrence considers command from the lens of mathematics, biology and psychology and states that the

elements of war are “the algebraical element of things, a biological element of lives and the psychological element of ideas.”⁶⁶

Lawrence’s algebraical/math approach looked at the time, space, purpose, and risk. The analysis discovered the Arabs could fight without many fears of culmination, did not need to seize territory due to the vast expanse of the desert and acknowledges the risk inherent in the fact that the Arabs valued their soldiers more than the Turks, could not afford to lose as many as the Turks, and continue to fight. Lawrence’s biological approach/element concerns “wear and tear” on the troops, identifying the enemy weaknesses and strengths, employment of reserves and how nine of ten could be taught tactics but one in ten could understand the art and generalship ability to understand risk: “nine tenths of tactics were certain enough to be teachable in schools; but the irrational tenth was like the kingfisher flashing across the pool, and in it lay the test of generals . . . possibility of accident, of some flaw in materials was always in the generals mind.”⁶⁷

Similarly, Lawrence identifies the need to disintegrate the Turkish system and prevent the Turks from having a willingness and ability to fight on a psychological level by affecting the physical space and materials. Lawrence acknowledges the need to destroy Turkish materials and thus their capability to fight by identifying the Turkish center of gravity. “The death of a Turkish bridge or rail, machine or gun or charge of high explosive, was more profitable to us than of a Turk.”⁶⁸ It is through the reflective lens of creativity that Lawrence is able to clearly identify how to defeat the Turks through a targeting of their sustainment capabilities, restrict their operational reach and force their culmination.

Lawrence uses the creative thought process of reflection to enable alternative understanding of the OE. While considering the Arab war against the Turks, Lawrence practices a creative approach to thought like Schon’s “reflection-in-action,” where “we think critically about

⁶⁶ Lawrence, *Seven Pillars of Wisdom*, 192.

⁶⁷ *Ibid.*, 193.

⁶⁸ *Ibid.*, 194.

the thinking that got us into this fix or opportunity; and we may in the process restructure strategies of action, understanding of phenomenon or ways of framing problems.”⁶⁹ Schon’s reflection-in-action is “the rethinking of some part of our knowing-in-action leads to on the spot experiment and further thinking that affects what we do—in the situation at hand and perhaps also in others we shall see similar to it.”⁷⁰ Lawrence discusses his reflection in action showing understanding of operational art to defeat the Turks’ system:

Ours should be a war of detachment. We were to contain the enemy by the silent threat of a vast unknown desert, not disclosing ourselves till we attacked. The attack might be nominal directed not against him, but against his stuff; so, it would not seek either his strength or his weakness but his most accessible material . . . never engaging the enemy. This would chime with the numerical plea for never affording a target . . . to defend nothing and to shoot nothing . . . our cards were speed and time, not hitting power.⁷¹

In sum, Lawrence’s pursuit of learning to uncover a more accurate understanding of the nature of the Arab’s dilemma in defeating the Turks highlights the journey he takes to understand what he has learned, appreciate what he doesn’t and determine a process to learn the unknown.⁷²

By viewing the OE as a system through the designing of the operational approach, Lawrence looked at social construction of reality, analogous to its algebra, as well as asking informative questions to determine that the Turks cared about equipment, “stuff,” and the Arabs valued their people. Lawrence’s systemic thinking further set the conditions to develop a novel and unique approach to neutralizing the Turks in the desert by seeing the desert’s vastness as an Arab capability and using the desert’s vastness to his advantage. He understood systems because he grasped the ecological and biological side of the environment and saw differences between how the British, Arabs, and Turks saw warfare differently. Lawrence provided insights that are a

⁶⁹ Donald A. Schon, *Educating the Reflective Practitioner* (San Francisco, CA: Jossey Bass, 1987), 28.

⁷⁰ *Ibid.*, 29.

⁷¹ Lawrence, *Seven Pillars of Wisdom*, 194, 196.

⁷² School of Advanced Military Studies, *Art of Design*, Student Text Version 2.0 (Fort Leavenworth, KS: SAMS, 2019), 54.

case study in understanding conflict at an operational level. Furthermore, his perceiving the environment through a holistic approach and correct thinking produced creative thinking, enabling a successful plan.

John Boyd: Framing Change in order to Change

Boyd developed a theory of learning to uncover creative thinking through extensive study of warfare, science and theory. An analysis of Boyd's contributions to creative thinking educates generals and their staffs on creative thinking during planning and supports this study's hypothesis. Boyd incorporated science into military planning and thought and introduced the language of new physics, chaos theory, and complexity theory into military thinking.⁷³ Boyd designed a creative mental approach that is vital to execution of operational art.

Boyd's research was informed by Polanyi and his concept that there are two levels of awareness and humans employ both.⁷⁴ Understanding and knowledge are action oriented and a process, where we make sense of reality by categorizing it at the lower levels. At the higher level, humans synthesize information through the "integrating power of the mind" (i.e. implicit tacit knowing). Polanyi's approach is vital to operational art as his teachings and critiques on objectivity help us understand that most knowledge is social in nature and based on interpretation as opposed to known facts. Similar concepts such as Kahneman's System 1 and 2 thinking systems support the importance of self-awareness and bias avoidance in creative thought.⁷⁵ The

⁷³ Osinga, *Science, Strategy and War*, 54.

⁷⁴ *Ibid.*, 59.

⁷⁵ Daniel Kahneman, *Thinking Fast and Slow* (New York: Farrar, Straus and Giroux, 2013), 4. Senior leaders and their staffs must remain aware of their "biases of intuition."⁷⁵ Kahneman's thesis is that we can improve our judgement and decision making by understanding System 1 and 2, understanding when to force ourselves to think slowly (use more of System 2) and be self-aware of our biases of intuition. Planners are humans and susceptible to the mental capacities and vulnerabilities of any other organization challenged with understanding the condition of reality and making appropriate decision to address issues in time, space and for given purposes. Without the appropriate mental frame of mind, clear and accurate understanding is absent, and the effectiveness of the US Army's operations process inevitably fails. Kahneman writes that most people are inherently mentally lazy. They are overconfident and trust their intuition more than their System 2 capabilities which causes them to incorrectly draw conclusions.

more generals and their staffs can prevent bias, the more capable they are to employ creative thinking.

Understanding Boyd's observe, orient, decide, and act (OODA) Loop structure provide processes that can generate creative thinking and enable decision making in operational warfare. Boyd's OODA Loop addresses the research question of bias in decision-making. When focusing on the observation and orientation portions of the OODA Loop, we encounter the space where generals and their staffs develop their understanding of the OE and begin to visualize.⁷⁶ Key questions can be asked within the observe and orient phases that provide opportunities for asking critical questions which form creative thought.

In the observation phase, the individual processes change occurring from implicit guidance and control, outside information, unfolding circumstances and unfolding environment interactions. In the orient phase of the OODA Loop we make sense of what we observe and begin to posture ourselves to decide. Orientation is made up of five components that influence how we orient consisting of cultural traditions, analysis and synthesis, previous experiences, new information and our genetic heritage. Just as Lawrence questions his and the Arab's secondary socialization and its impact on how the Arabs oriented to the Turks, cultural traditions concern determining what legacies shape my existing understanding and institutional or organizational attitudes, patterns of behavior and assumptions. When contemplating cultural traditions, we ask what our learning references are and what gaps are exposed between traditional understanding and emergence.

Boyd's ideas on observation and orientation are important because they provide the space for new perspective and change—to design a unique operational approach. Boyd's ideas illustrate that creative thought and design must be used when generals and staffs do not understand the OE by going back to the last instance where the OE was understood and attempt to re-understand the

⁷⁶ Osinga, *Science, Strategy and War*, 2, 8-10, 15, 58-60.

system—or reframe understanding.⁷⁷ Once we achieve understanding of the current state, operational approaches can be made to construct a desired future state comprising the testing of the operational approach in the decide and act phases.

Creativity and its application to problem solving can also provide opportunities to recognize and create desired anomalies or mitigate undesired ones during the paradigm of warfare. Boyd wrote that strategic activities were like the Kuhnian scientific endeavor of development of scientific thought through the framework of paradigms and anomalies.⁷⁸ Operational level actions can be viewed through a scientific lens. He effectively highlights the similarities between the scientific systems and basic concepts of survival and growth, stating

...since survival and growth are directly connected with the uncertain, ever changing, unpredictable world of winning and losing we will exploit this whirling (conceptual) spiral of orientation, mismatches, analysis/synthesis, reorientation, mismatches, analysis/synthesis . . . so that we can comprehend, cope with, and shape as well as be shaped by that world and the novelty that arises out of it.⁷⁹

Boyd’s approach to destroying and creating thought patterns allows us to improve our capacity for independent action to be able to survive in environments “free or independent of debilitating external influences.”⁸⁰ The operational artist can seek to understand and manage the system through survival on our own terms and provide options to operational commanders: “to diminish (the) adversary’s capacity while improving our capacity to adapt as an organic whole, so that our adversary cannot cope while we can cope with events/efforts as they unfold.”⁸¹

Systemic thinking and the awareness of holistic perspectives in the system allow generals and their staffs to employ creative thinking to find unique solutions to problems. Gen. Stanley McCrystal, Ret. USA, describes the creativity employed early in the War on Terror as a necessary

⁷⁷ Osinga, *Science, Strategy and War*, 78-79.

⁷⁸ *Ibid.*, 64.

⁷⁹ *Ibid.*

⁸⁰ Boyd, *Destruction and Creation*, 1.

⁸¹ Osinga, *Science, Strategy and War*, 101.

transformation of the Joint Special Operations Task Force during Operation Enduring Freedom.

He notes that

What began as a heavily conventional military campaign to unseat the regime of Saddam Hussein had, by the fall of 2003, become a bitter unconventional struggle against frustrated Sunnis who increasingly coalesced around a charismatic Jordanian extremist who had taken the name of Abu Musab al Zarqawi.⁸²

They struggled with an environment that was fundamentally different from that for which they had planned or trained. Plans often unfolded much differently than envisioned. This became the reality of the battle against a counterinsurgency force and required constant creativity and systems thinking. For the past two decades, the focus has been on COIN operations. COIN planning is inherently different from LSCO planning, so creativity will be required to develop new approaches to planning challenges.

In sum, it is possible to argue that creativity is the product of operational art that understands thinks in systems. Creativity is a consequence product of operational art and systems thinking. Creativity produces novel strategies and approaches—like the war of detachment. Creativity is the result of senior leaders and their staffs’ understanding of the operational environment, their ability to manipulate the variables in systems to change the given system and confidence to attempt to create desired end states. Where doctrine and the systems approach represent some of the science of warfare, creativity assists the development of the artful side of effective planning. It may be incredibly difficult to develop geniuses on staffs at the operational level, but the harnessing and development of creativity directly improves operational planning as we have witnessed throughout history. Without creative minds at the operational planning level, senior leaders and their staffs are reactive instead of proactive and less agile, guaranteeing inevitable irrelevance. Arena writes that organizations must remain more liquid than static, and agile to create “adaptive space,” the environment where the organization can exploit the tension

⁸² General Stanley McChrystal, Ret. USA, *Team of Teams: New Rules of Engagement for a Complex World* (New York: Penguin, 2015), 2.

between the pressures to adapt and pressures to produce to discover, develop and diffuse new ideas across the organization.⁸³

Operational artists must continuously be critical thinkers and fully assess what they think they know throughout operations, remaining as unbiased as possible. Polanyi and Boyd's assertions that scientists/agents operate based on their intuitions more than they think is revolutionary as they build a behavior sequence of perception, intuition and creativity operational artists must recognize.⁸⁴ This recognition of the socialization of information is crucial in our understanding of how meaning and creativity are crucial in applying operational art.

Conclusion

Operational art that is anchored in systems thinking and creativity empowers generals and their staffs to think holistically about warfare beyond the level of tactical operations.

Systems thinking allows these leaders to understand and manage complex conditions and develop unique campaign plans to exploit enemy weaknesses, induce operational shock, and defeat the enemy. An understanding of operational art in the current environment requires recognizing the origins of the concept and the change to systems thinking to see the battlefield holistically, as a complex system and facilitating creative thought.

Operational planners have difficulty understanding and employing operational art in the planning and management of combat operations. One of the primary cognitive challenges in modern warfare is successfully coordinating tactical actions to achieve strategic end states that satisfy the political aim. Further difficulties arise when political aims are fluid and susceptible to change while tactical actions on the battlefield remain more constant to address yesterday's dilemmas and objectives. As a foundation for the study, the discussion on the deeper meaning of

⁸³ Michael J. Arena, *Adaptive Space: How GM and Other Companies are Positively Disrupting Themselves and Transforming into Agile Organizations* (New York: McGraw-Hill, 2018), 11.

⁸⁴ Osinga, *Science, Strategy and War*, 60.

operational art with an appreciation for the Russian theorists' relevant contributions served as a springboard for evaluating the challenges senior leaders and their staffs face when employing of operational art today.

The study identified the importance of systems theory in understanding the battlefield and employing fundamental concepts like the elements of operational art throughout campaign planning and execution. Systems thinking addressed the research question addressing how to understand and employ operational art. One of the primary challenges facing employment of systems thinking in campaign planning is that most US Army and Joint planning is linear in nature.

Similarly, planners have difficulty employing systems theory because the Joint Forces and US Army planning and operations process is commander-centric, and few members of planning staffs are thinking as holistically as the commander. Commanders cannot be the only ones thinking about wholes made of parts and the bigger picture for successful planning in operational warfare. Staffs will need to be educated and encouraged to support generals by thinking holistically and with systems thinking perspectives to facilitate employment of operational art.

Just as an understanding and employment of systems thinking is crucial to managing operations, the study discussed the importance of creativity in the execution of operational art. The study discussed the limited doctrinal guidance on creative thinking and used the writings and ideas of Lawrence and Boyd to illuminate the importance of creative thinking and how to improve creative capabilities. Creativity is vital to campaign planning because planners must use innovative thinking to solve unfamiliar problems or existing problems under different conditions in the OE. The study found that simultaneous familiarity of operational art and understanding the operational environment through the lens of systems theory enabled creative thinking.

Lawrence's systems thinking provided a good example of how to set the conditions to develop a novel and unique operational approach. Similarly, Boyd's writings and ideas on

theories of learning, the importance of creativity and decision-making highlight how thinking the correct way about the environment enables creative thinking. Lawrence and Boyd's writings illustrate how generals and their staffs must fully understand the OE in terms of time, space, purpose, risk, opportunities and resources, as well as appropriately accounting for the elements of operational art throughout planning. Generals and their staffs must understand how to identify a system and reframe/refine its nature through the influence and adjustment of variables to affect the complex adaptive system and achieve strategic goals.

Bibliography

- Alexander, Mikaberidze. "The Limits of the Operational Art: Russia 1812." In *Napoleon and the Operational Art of War: Essays in Honor of Donald D. Howard*, edited by Michael V. Leggiere, 265-316. Leiden, The Netherlands: Brill, 2016.
- Arena, Michael J. *Adaptive Space: How GM and Other Companies are Positively Disrupting Themselves and Transforming into Agile Organizations*. New York: McGraw-Hill, 2018.
- Axelrod, Robert, and Michael D. Cohen. *Harnessing Complexity: Organizational Implications of a Scientific Frontier*. New York: Basic Books, 2000.
- Berger, Peter L., and Thomas Luckmann. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. New York: Doubleday, 1966.
- Bertalanffy, Ludwig von. *General System Theory*. New York: George Braziller, 1968.
- Blythe Jr., Lt. Col. Wilson C. "A History of Operational Art." *Military Review* (November-December 2018): 37-49.
- Boyd, John. *Destruction and Creation*. 3 September 1976. Accessed 6 December 2019.
http://www.chetrichards.com/modern_business_strategy/boyd/destruction/destruction_and_creation.htm.
- Clausewitz, Carl von. *On War*. Edited and Translated by Michael Howard and Peter Paret. Princeton, NJ: Princeton University Press, 1976.
- de Czege, Huba Wass. "Systemic Operational Design: Learning and Adapting in Complex Situations." *Military Review* (January-February 2009): 2-12.
- . "Thinking and Acting Like an Early Explorer: Operational Art is Not a Level of War." *Small Wars Journal*, 14 March 2011. Accessed 28 October 2019.
<https://smallwarsjournal.com/blog/journal/docs-temp/710-deczege.pdf>.
- Dolman, Everett Carl. *Pure Strategy: Power and Principle in the Space and Information Age*. New York: Routledge, 2005.
- Dorner, Dietrich. *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations*. Cambridge, MA: Perseus Books, 1996.
- Elkus, Adam. "Operational Art and Modern American Strategy." Open Democracy. December 2009. Accessed 22 February 2020. <https://www.opendemocracy.net/en/opensecurity/operational-art-and-modern-american-strategy/>.
- English, Allan D., and Howard Coombs. *The Operational Art: Canadian Perspectives: Contexts and Concepts*. Ontario: Canadian Defense Academy Press, 2005.
- Fogg, Maj. Gen. Rodney D., and Lt. Col (Ret) William C. Latham Jr. "Risky Business: Commercial Support for Large Scale Ground Combat Operations." *Military Review* (July-August 2019): 14-21.

- Gharajedaghi, Jamshid. *Systems Thinking: Managing Chaos and Complexity*. Burlington, MA: Morgan Kaufman, 2011.
- Glantz, David M., and Harold S. Orenstein, trans. *The Evolution of Soviet Operational Art, 1927–1991: The Documentary Basis. Volume 1: Operational Art, 1927-1964*. London: Frank Cass, 1995.
- . *The Evolution of Soviet Operational Art, 1927–1991: The Documentary Basis. Volume II: Operational Art, 1965-1991*. London: Frank Cass, 1995.
- Graicer, Ofra. *Two Steps Ahead: From Deep Ops to Special Ops – Wingate the General*. Tel Aviv, Dayan Base, 2009.
- Haidt, Jonathan. *The Righteous Mind: Why Good People Are Divided by Politics and Religion*. New York: Pantheon Books, 2012.
- Hirsch, Gal. *Defensive Shield*. Translated and adapted by Reuben Ben-Shalom. New York: Gefen Publishing House, 2016.
- Hughes, Daniel J., ed. *Moltke on the Art of War: Selected Writings*. Translated by Daniel J. Hughes and Harry Bell. Novato, CA: Presidio, 1993.
- Irwin, Ash. *The Levels of War, Operational Art and Campaign Planning*. Camberley: Strategic and Combat Studies Institute, 1993.
- Isserson, Georgii Samoilovich. *The Evolution of Operational Art*. Translated by Bruce W. Menning. Fort Leavenworth, KS: Combat Studies Institute Press, 2013.
- Jervis, Robert. *How Systems Work: A Perspective on Political and Social Life—Complex Systems: The Role of Interactions*. Princeton, NJ: Princeton University Press, 1997. Accessed 5 March 2020. <http://www.dodccrp.org/html4/bibliography/comch03.html>.
- Jomini, Antoine Henri. *The Art of War*. Translated by George H. Mendell and William P. Craighill. Westport, CT: Greenwood, 1971.
- Jones, Michael G. *The Operational Level of War: A Primer*. Carlisle Barracks, PA: US Army War College, 1988.
- Kelly, Justin, and Mike Brennan. *Alien: How Operational Art Devoured Strategy*. Carlisle, PA: Strategic Studies Institute, 2009.
- Kipp, Jacob W. “The Tsarist and Soviet Operational Art, 1853-1991.” In *The Evolution of Operational Art: From Napoleon to the Present*, edited by John Andreas Olsen and Martin van Creveld, 64-95. New York: Oxford University Press, 2011.
- Kuehn, John T. *Napoleonic Warfare: The Operational Art of the Great Campaigns*. Santa Barbara, CA: Praeger, 2015.
- Lawrence, T. E. *Seven Pillars of Wisdom: A Triumph*. New York: Random House, 1991.
- Leggiere, Michael V., ed. *Napoleon and the Operational Art of War: Essays in Honor of Donald D. Howard*. Lieden, The Netherlands: Brill, 2016.

- Leonhard, Robert R. *Fighting by Minutes: Time and the Art of War*, 2nd ed. Westport, CT: Praeger, 2017.
- McChrystal, General Stanley, Ret. USA. *Team of Teams: New Rules of Engagement for a Complex World*. New York: Penguin, 2015.
- Megargee, Geoffrey P. *Inside Hitler's High Command*. Lawrence, KS: University Press of Kansas, 2000.
- Naveh, Shimon. *In Pursuit of Military Excellence*. London: Frank Cass, 1997.
- Newell, Clayton R., and Michael D. Krause. *On Operational Art*. Washington, DC: Center of Military History, United States Army, 1994.
- Olson, John Andreas, and Martin Van Creveld, eds. *The Evolution of Operational Art: From Napoleon to the Present*. New York: Oxford University Press, 2011.
- Osinga, Frans P. B. *Science, Strategy and War: The Strategic Theory of John Boyd*. New York: Routledge, 2007.
- Sakvin, V. Ye., *The Basic Principles of Operational Art and Tactics: A Soviet View*. Forest Grove, OR: University Press of the Pacific, 2002.
- Schon, Donald A. *Educating the Reflective Practitioner*. San Francisco, CA: Jossey-Bass, 1987.
- Senge, Peter M. *The Fifth Discipline: The Art and Practice of a Learning Organization*. New York: Random House, Doubleday, 1990.
- Shekleton, Mike. "Developing Strategic Leaders." RealClear Defense, 7 December 2016. Accessed 18 February 2020. https://www.realcleardefense.com/articles/2016/12/07/developing_strategic_leaders_110453.html.
- Simpkin, Richard E. *Race to the Swift: Thoughts on Twenty-First Century Warfare*. London: Brassey's Defence Publishers, 1980.
- Snowden, David J., and Mary E. Boone. "A Leader's Framework for Decision Making." *Harvard Business Review* (November 2007): 68-76.
- Stahel, David. *The Battle for Moscow*. Cambridge, UK: Cambridge University Press, 2015.
- Svechin, Aleksandr A. *Strategy*. Edited by Kent D. Lee. Minneapolis, MN: East View, 1992.
- US Department of the Army. Army Doctrinal Publication (ADP) 3-0, *Operations*. Washington, DC: Government Printing Office, 2019.
- . Army Doctrine Publication (ADP) 5-0, *The Operations Process*. Washington, DC: Government Printing Office, 2019.
- . Army Doctrine Reference Publication (ADRP) 5-0, *The Operations Process*. Washington, DC: Government Printing Office, 2012.

- . Army Techniques Publication (ATP) 5-0.1, *Army Design Methodology*. Washington, DC: Government Printing Office, 2015.
- . Field Manual (FM) 3-0, *Operations*. Washington, DC: Government Printing Office, 2017.
- . Field Manual (FM) 3-21.8 (FM 7-8), *Infantry Rifle Platoon and Squad*. Washington, DC: Government Printing Office, 2007.
- . Field Manual (FM) 3-90-2, *Reconnaissance, Security and Tactical Enabling Tasks*. Washington, DC: Government Printing Office, 2013.
- . Field Manual (FM) 90-26, *Airborne Operations*. Washington, DC: Government Printing Office, 1990.
- . Field Manual (FM) 100-5, *Operations*. Washington, DC: Government Printing Office, 1976.
- . Field Manual (FM) 100-5, *Operations*. Washington, DC: Government Printing Office, 1982.
- US Department of Defense, Joint Staff. Joint Publication (JP) 2-01.3, *Joint Intelligence Preparation of the Operational Environment*. Washington, DC: Government Printing Office, 2014.
- . Joint Publication (JP) 5-0, *Joint Operation Planning*. Washington, DC: Government Printing Office, 2011.
- Waitl, Florian L., ed. *Into the Breach: Historical Case Studies of Mobility Operations in Large Scale Combat Operations*. Fort Leavenworth, KS: Army University Press, 2018.
- Unknown. *Part II: Operational Design: A Theory of Mediation*. n.d. Printout received from Monograph Director.