The US Army May Need to Redefine the Elements of Operational Art for Future Warfare

A Monograph

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The United States considers China a peer threat and in the event of war with China, the US would likely conduct large-scale combat operations (LSCO) to achieve national objectives. However, China does not conceptualize warfare in the form of LSCO. Instead, they pursue systems destruction warfare (SDW). The conduct of LSCO against China's SDW may reveal challenges in achieving the desired tempo, and forcing China to culminate. Additionally, LSCO against SDW may reveal that the US Army has to potentially shift its assessment of operational risk from a focus on land operations to one of systems operation. Tempo, culmination, and risk are three of the ten elements of operational used to assess the challenges of LSCO against SDW. However they also provide a precursor for the US Army to redefine elements of operational art for future warfare.

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Abstract

The US Army May Need to Redefine the Elements of Operational Art for Future Warfare, by MAJ Leroy A. Alveranga, 39 pages.

The United States considers China a peer threat and in the event of war with China, the United States would likely conduct large-scale combat operations (LSCO) to achieve national objectives. However, China does not conceptualize warfare in the form of LSCO. Instead, they pursue systems destruction warfare (SDW). The conduct of LSCO against China's SDW may reveal challenges in achieving the desired tempo, and forcing China to culminate. Additionally, LSCO against SDW may reveal that the US Army has to potentially shift its assessment of operational risk from a focus on land operations to one of systems operation. Tempo, culmination, and risk are three of the ten elements of operational used to assess the challenges of LSCO against SDW. However they also provide a precursor for the US Army to redefine elements of operational art for future warfare.

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Abbreviations

ADP	Army Doctrine Publication
AI	Artificial Intelligence
COIN	Counterinsurgency Operations
DoD	Department of Defense
LSCO	Large Scale Combat Operations
MDO	Multi-Domain Operations
NDS	National Defense Strategy
NSS	National Security Strategy
OE	Operational Environment
PLA	People's Liberation Army
SDW	System Destruction Warfare
US	United States
WWII	World War II

Introduction

After almost two decades of conducting limited contingency operations in Iraq and Afghanistan, the United States (US) Army has shifted its focus to large-scale combat operations (LSCO) to address a very different operational environment (OE) with peer and near-peer adversaries.[1] LSCO is the US Army's response to the return of great power competition.[2] Retired US Army General, Michael Lundy, former Commanding General of US Army Combined Arms Center, remarked that "an increasingly volatile OE characterized by great power competition demands that our army adapts to the realities of a world where large-scale ground combat against a peer threat is more likely than at any time in recent history."[3] The United States considers China a peer threat. China's increasing global influence, its modernized military, and its aggressive activities in the South China Sea threatens United States' global leadership and the rules-based international order. The United States' national security documents term this threat as competition and identify China as a primary concern of the United States' national security.[4] Former Secretary of Defense, Mark Esper, in July 2020, said China and the countering of its military capabilities are the primary focus for the United States Department of Defense (DoD).[5]

The competitive emergence of China has challenged the established political, economic, and military dominance of the United States and has created the potential for what political

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[1] US Department of the Army, Field Manual (FM) 3-0, *Operations* (Washington, DC: Government Publishing Office, 2017), 2.

[2] US Department of the Army Training and Doctrine Command, TRADOC Pamphlet 525-3-1, *The US Army Operating Concept: Win in a Complex World, 2020-2040* (Fort Eustis, VA: US Army Training and Doctrine Command, 2014), 14.

[3] Michael Lundy, "Meeting the Challenge of Large-Scale Combat Operations Today and Tomorrow," *Military Review* 98, no. 5 (September-October 2018): 112, accessed January 20, 2021, https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/SO-18/SO-18-Book.pdf.

[4] US Department of Defense, *Summary of National Defense Strategy of the United States of America 2018* (Washington, DC: Government Printing Office, 2018), 1.

[5] Mark Esper, "Implementing the National Defense Strategy: A Year of Successes," Media Defense, July 17, 2020, accessed January 31, 2021, https://media.defense.gov/2020/jul/17/2002459291/-1/-1/1/nds-first-year-accomplishments-final.pdf.

scientist, Graham T. Allison, coined as the "Thucydides's Trap." The "Thucydides's Trap" references the Greek historian Thucydides' depiction of the Peloponnesian War in which two regional powers, the emergent Athenians and the incumbent Spartans, inevitably went to war.[6] Sparta conducted a pre-emptive attack on Athens with the assumption that they would fight according to a similar concept of warfare. Allison saw this as a similar mental "trap" in which the United States and China inevitably go to war over global hegemonic status. The US Army's shift to LSCO suggests that the United States believes that China's Army would engage in a similar style of warfare.[7] In the event of such a war, LSCO versus the Chinese way of war, may expose the need for an evolution of how United States' military operations are cognitively visualized and described, and executed to support national objectives.

Statement of the Problem

The US Army, the primary force in LSCO, visualizes warfare on a clearly defined physical battlefield where tactical formations of corps, divisions, and brigades conduct movement, fires, and maneuver to win the land campaign.[8] This LSCO battlefield framework supports a structured approach to conducting military operations in phases across a geographically divided space. The phases are denoted by Phase 0–Shaping, Phase 1–Deter, Phase II–Seize Initiative, Phase III–Dominate, Phase IV–Stabilize, and Phase V–Enable Civil Authority.[9] The geographic construct is expressed as deep, close, support, and consolidation areas positioned in relation to the adversary's location, from furthest to closest.[10]

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[6] Graham Allison, "The Thucydides Trap: Are the U.S. And China Headed for War," *The Atlantic*, September 24, 2015, accessed February 12, 2021, https://www.theatlantic.com/international /archive/2015/09/united-states-china-war-thucydides-trap/406756/.

[7] Ibid.

[8] US Army, FM 3-0, 1-3.

[9] Ibid., 1-12.

[10] Ibid., 1-126.

The LSCO battlefield structure is visualized as being large enough to facilitate US Army forces with enablers and enemy forces with enablers. The US Army's role on the LSCO battlefield is to execute corps and division level operations against an adversary to secure, seize, and occupy terrain while sustaining itself.[11] To put into context, a US Army corps is task-organized to control and coordinate the maneuver of two to five Army divisions in LSCO; this equates to between 20,000 and 45,000 Soldiers.[12] The corps is supported by operations from military services in the other domains—primarily air, maritime, space, and cyberspace.[13] From the US Army's perspective, the adversary is organized in a similar format. This model is indicative of the conventional battlefields of opposing armies such as those in World War II (WWII). However, future battlefields may not conform to the LSCO battlefield framework and how US Army commanders and staff cognitively understand the OE, visualize, and describe military operations may be obsolete, especially against a potential adversary that does not subscribe to such a framework.

China is one such potential adversary with a different type of warfare called System Destruction Warfare (SDW). China's People's Liberation Army (PLA) defines SDW as the confrontation and destruction of an enemy's operational systems.[14] Operational systems is a term used to define the relationship of the hardware, software, network components, and processes that work in unison to enable warfighting across all domains.[15] SDW is organized, visualized, and executed across an all-domain battlefield—land, sea, air, outer space, nonphysical space,

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[11] US Department of the Army, Army Doctrine Publication 1, *The Army* (Washington, DC: Government Publishing Office, 2019), v.

[12] US Department of Defense, "Team," Defense.gov, accessed April 2, 2021, https://www.defense.gov/Experience/Military-Units/Army/#army.

[13] US Army, FM 3-0, 1-3.

[14] Edmund Burke, Kristen Gunness, Cortez A. Cooper III, and Mark Cozad, *People's Liberation Army Operational Concepts* (Santa Monica, CA: RAND Corporation, 2020), iii, accessed February 12, 2021, https://www.rand.org/pubs/research_reports/RRA394-1.html.

[15] Ibid., 8.

electromagnetic, and the psychological domain—constructed of operational systems.[16] The PLA's SDW seeks complete dominance by contesting an enemy's operational systems using kinetic and non-kinetic strikes with multidimensional and multifunctional operational systems. SDW strikes focus on paralyzing the functions of an enemy's operating system to break their will and degrade their ability to fight.[17] The SDW operational framework discounts conventional warfare of opposing armies or enemy annihilation on a physical battlefield.[18] The differences between LSCO and SDW suggest that the US Army's conceptualization of military operations in future warfare may need to be redefined to effectively connect their tactical actions and desired military end state to the achievement of national objectives.

Operational art is the cognitive process used by commanders and staff to effectively link tactical actions and military end states to accomplish or support the national strategic objectives.[19] For Army commanders, the cognitive process in employing operational art is underpinned by the elements of operational art. The ten elements of operational art are end state and conditions, center of gravity, decisive points, lines of operations and lines of effort, basing, tempo, phasing and transitions, culmination, operational reach, and risk. These elements shape how an Army commander understands the operational environment and visualizes and describes the approach to military operations primarily in the land domain.[20] The Vietnam War demonstrated the importance of this linkage/operational art for the US Army. The US Army achieved the preponderance of tactical victories in the Vietnam War but could not transform them

[16] Burke et al., 8.

[17] Jeffrey G. Engstrom, *Systems Confrontation and System Destruction Warfare: How the Chinese People's Liberation Army Seeks to Wage Modern Warfare* (Santa Monica, CA: RAND Corporation, 2018), x, 13.

[18] Ibid., xi.

[19] US Department of the Army, Army Doctrine Publication (ADP) 3-0, *Operations* (Washington, DC: Government Publishing Office, 2019), 1-6.

[20] Ibid., 2-6.

into strategic outcomes.[21] Perhaps one reason for this failure was the difference in the enemy's irregular warfare (mixture of guerrilla and conventional warfare) concept and US Army's conventional way of war. US Army may encounter a similar plight in employing operational art if executing LSCO against the PLA's SDW.

Research Question

What are the challenges the US Army could face in employing operational art given the differences between LSCO and SDW?

Hypothesis

The US Army's employment of the elements of operational art, given their current definitions, are applicable for LSCO-to-LSCO conflict but may not be wholly applicable in a future conflict between LSCO and SDW. The rapid advancement in technology is changing the character of future warfare with more significant implications on the tempo of warfare, the definition of culmination, and the exposure of a different kind of risk to the US Army's role in future warfare. Tempo, culmination, and risk are three elements of operational art whose definition may create challenges for the US Army, given the differences between LSCO and SDW. The use of these three elements may provide insight into whether all operational art elements, given their current definition, are valid or useful in future conflicts. Should they evolve for the US Army to effectively support the national objectives?

Methodology

A LSCO versus SDW conflict offers an example to examine the validity in employing the three elements of operational art given their current US Army doctrinal characterization. To ensure a holistic approach, the research puts LSCO and SDW into context by examining the foundational concepts of warfare by the United States and China and the contemporary OE that

[21] Michael Detlef Krause and R. Cody Phillips, ed., *Historical Perspective of the Operational Art* (Washington, DC: Center of Military History, United States Army, 2005), 13.

informed both LSCO and SDW. The value of putting LSCO and SDW into context provides insight into the underlining thoughts and assumptions that informed both warfare concepts. The research then uses the three elements of operational art as the conceptual framework to assess the US Army's application challenges given time, space, and resources. The definitions of time, space, and resources are constructed from a synthesis of their use in US Army doctrine. Time is defined as the speed of military operations and decision-making to achieve the desired outcome.[22] The term space represents all the domains—land, sea, air, space, cyberspace, electromagnetic, and psychological space.[23] The use of resources denotes the requisite training and equipment at echelons to conduct operations.[24] However, there are some research limitations.

The monograph will limit its focus on US Army LSCO, PLA's SDW, and the selected elements of operational art. The US Army is shifting to a Multi-Domain Operations (MDO) warfare concept. However, MDO is not a focal point of this monograph because it only exists in a US Army Training and Doctrine Pamphlet form and is not codified in a doctrinal US Army publication. Additionally, given the constraints of the monograph, there is not enough space to expand on the MDO concept. However, this research may provide considerations in defining the elements of operational art in the creation of the MDO doctrine.

Background to Research

In 1991 the Cold War between the United States and the Union of Soviet Socialist Republics, ended and resulted in the United States becoming the global hegemon.[25] Since that time, Russia and China have increasingly challenged the United States' global hegemony. Russia's seizure and annexation of Crimea in 2014 and China's increasingly aggressive activities

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[22] US Department of the Army, Army Techniques Publication (ATP) 5-0.1, *Army Design Methodology* (Washington, DC: Government Publishing Office, 2015), 5-7.

[23] Ibid., 3-1.

[24] Ibid., 5-8.

[25] Ronald O'Rourke, *Renewed Great Power Competition: Implications for Defense—Issues for Congress* (Washington, DC: Congressional Research Service, 2020), 1.

in the South and East China Seas since 2012 are only some of the events that threaten the United States' hegemonic status.[26] Additionally, Russia and China are currently modernizing their respective militaries and evolving their warfighting concepts, cementing their position as two emergent competitors in a new era of global great power competition.[27]

Great power competition was highlighted during the Obama Administration's June 2015 National Military Strategy. It later became a central theme in the Trump Administration's December 2017 National Security Strategy (NSS) and January 2018 National Defense Strategy (NDS).[28] The renewal of great power competition is evidenced by the NSS 2017 quote, "after being dismissed as a phenomenon of an earlier century, great power competition returned. China and Russia began to reassert their influence regionally and globally."[29] The NDS 2018 also echoed the same theme by referring to Russia's and China's activities as "the reemergence of long-term, strategic competition."[30]

With the renewal of great power competition, LSCO became the focus, primarily to combat Russian aggressive activities. In a 2007 speech, Russian President Vladimir Putin asserted that Russia would play a more active part in global affairs, disparaged, and rejected the concept of a singular global power, and promoted a multipolar global order. Additionally, the 2008 Russian invasion and occupation of part of the former Soviet republic of Georgia influenced a LSCO focus by the US Army.[31] The Russian regional aggression also sparked recreation of US Army formations and force projection exercises.

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[26] O'Rourke, 21.

[27] Ibid., 2.

[28] President of the United States, *National Security Strategy of the United States of America* (Washington, DC: Government Publishing Office, 2015), 27.

[29] President of the United States, *National Security Strategy of the United States of America* (Washington, DC: Government Publishing Office, 2017), 2.

[30] US Department of Defense, *Summary of National Defense Strategy of the United States of America 2018*, 2.

[31] O'Rourke, 25.

The US Army reactivated the V Corps headquarters and implemented the Defender Europe exercise. The US Army reactivated V Corps to increase its inventory by one corps and strengthen its European presence.[32] Additionally, the US Army instituted Defender Europe, an annual training exercise to demonstrate the North Atlantic Treaty Organization's ability to project extensive military capability of a large scale to deter and defend against aggression. Defender Europe is like the Cold War-era exercise, Return of Forces to Germany Exercise (REFORGER) series. REFORGER was also designed as a division-level force projection exercise to support North Atlantic Treaty Organization's posture to defend at a known location against a known adversary—potentially Russia, who doctrinally fights LSCO. The refocus to LSCO seemed to address the Russian threat primarily. However, Russia is currently transitioning towards fourth-generation warfare – an adaptive approach in the use of military and non-military tactics.[33] Russia's transitioning to fourth-generation warfare suggests that there is potentially a broader spectrum of future warfare that LSCO and the application of the elements of operational art may not address in practice. China and SDW can be considered a broader spectrum of future warfare.

Significance

The rapid advancement of technology is changing the character of warfare and how an Army commander assesses the milieu and constructs a scheme of military operations. Technological development suggests warfare is becoming less of a land domain, human endeavor, such as the World Wars, the Korean and Vietnamese Wars, to a multi-domain, information, and systems centric affair. This paradigm shift undermines the LSCO battlefield

[32] Kyle Rempfer, "Army Resurrects V Corps After Seven Years to Bolster Europe," *Army Times*, February 12, 2020, accessed February 12, 2021, https://www.armytimes.com/news/your-army/2020/02/12/army-resurrects-v-corps-after-seven-years-to-bolster-europe/.

[33] Gareth Thomas, Peter Williams, and Yanitsa Dyakova, "Exercise Defender-Europe 20: Enablement and Resilience in Action," *NATO Review*, June 16 2020, accessed February 12, 2021, https://www.nato.int/docu/review/articles/2020/06/16/exercise-defender-europe-20-enablement-and-resilience-in-action/index.html; Charles K. Bartles, "Getting Gerasimov Right," *Military Review* 96, no. 1 (January-February 2016): 30-38.

framework of a clearly defined physical space and potentially changes how US Army commanders apply the elements of operational art. The LSCO versus SDW analysis may reveal limitations in using operational art in future warfare and inform doctrinal changes to address the shortcomings.

Literature Review

The US and China's concepts of warfare and the practicality of a conflict between the two nations exposed the need for a change in the definition of elements of operational art. At the onset of the research, the aim was to examine LSCO as a valid approach to future warfare in response to a China threat. However, research documents revealed that the fundamental and practical differences between the US Army's LSCO and the PLA's SDW had more significant implications. The implication suggested a possible need to change the doctrinal definition of elements of operational to guide better the process by which commanders and staff effectively construct military operations. US Army doctrine emphasized that the element of operational art is the cognitive tool used by US Army commanders and staff to envision the battlefield and organize operations to achieve military and strategic objectives. To be effective, this cognitive tool, elements of operational art, needs to be applicable across a broad spectrum of conflict and battlefield framework. The research documents to support the underlining argument of this monograph are from four categories: US Government documents, US Army Doctrine, literature from research organizations, and literature by authors who have written on American and Chinese ways of war.

Government and think-tank research documents facilitated the understanding of the strategic environment surrounding LSCO and SDW. For the United States, the NSS and the NDS characterized the strategic environment as great power competition. The NSS 2017 highlighted that "after being dismissed as a phenomenon of an earlier century, great power competition

returned. China and Russia began to reassert their influence regionally and globally."[34] The NDS 2018 echoed the same theme by referring to Russia's and China's activities as "the reemergence of long-term, strategic competition."[35] Additionally, congressional research organizations, primarily Congressional Research Service, augmented the NSS and NDS as supporting documentation in shaping the strategic environment that informed LSCO. The Congressional Research Service documents provided granularity in the emergence of China and Russia and their attempt to challenge the United States' global hegemony with aggressive regional activities.

With China being the designated top priority for the DoD in 2020, two key documents highlighted the strategic and operational environment of China and the PLA and provided some context to SDW. The two documents, the Defense Intelligence Agency report, *China's Military Power*, and the DoD report, *Security Developments Involving the People's Republic of China 2020*, provided insight into how the United States understands China's strategic thought. Notable points relevant to the research was the PLA's concept of active defense - the leveraging of longer range, precision-guided munitions to create maximum standoff or access denial of a potential enemy, China's avoidance of direct threat references in their publications, and China's assessment of threats and opportunities emerging from the evolution of the international community major-power dynamics.[36] The notable points suggest that China and the PLA are not inclined to engage in a LSCO conflict but instead employ a more indirect, non-confrontational approach to conflicts.

The United States concepts of warfare are widely referenced by Russel Weigley's, *The American Way of War*, written in 1973. Weigley argues the core underpinnings of the US Army's

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[34] The President of the United States, *National Security Strategy of the United States of America* (2015), 2.

[35] US Department of Defense, *Summary of National Defense Strategy of the United States of America 2018*, 2.

[36] Defense Intelligence Agency, *China Military Power: Modernizing a Force to Fight and Win* (Washington, DC: Government Publishing Office, 2019), 3, 7, 10.

conception of warfare are offense, annihilation warfare, technologically advanced capabilities and a robust budget all combine to exact military superiority in the physical domain. Many contemporary authors have expanded on Weigley's work, but his research seemed to be the most prolific and well referenced.[37] For example, Max Boot in his journal article, "The New American Way of War," written in 2003, concurred with Weigley.[38]

Boot's work emerged thirty years after Weigley's and argued that advances in information technology had given form to a new American way of war, evidence by the invasion of Iraq. Boot described the new American way of war as the pursuit of a quick victory and characterized by speed, maneuver, flexibility, and surprise. This new way of war integrated air, naval, and land power into a unified whole force and profoundly relied on precision firepower, Special Forces, and psychological operations.[39] Boot's argument seemed only to modernize Weigley's thinking. However, he referenced that this new way of war had its origins in the defense reforms of the 1980s, which suggests the evolution of the airland battle concept and doctrine. The airland battle concept expanded the research to consider the impact of the contemporary environment on warfare at the operational level.

US Army airland battle doctrine is operations based on "nonlinear battles which attack enemy forces throughout their depth with fire and maneuver. They require the coordinated action of all available military forces in pursuit of a single objective."[40] Airland battle doctrine was heavily influenced by the Soviet threat, the 1973 Yom Kippur War, the German blitzkrieg tactics

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[37] Russel F. Weigley, *The American Way of War: A History of United States Military Strategy and Policy* (New York: Macmillan, 1973). Many contemporary writers built on Weigley's work to argue divergent thoughts or to account for contemporary changes in warfare. Some of these writers include Brian M. Linn, *The American Way of War Revisited*; and Antulio J. Echevarria, "Toward an American way of War."

[38] Weigley.

[39] Max Boot, "The New American Way of War," *Council on Foreign Relations* 82, no. 4 (July-August 2003): 41-42, accessed February 28, 2021, https://www.jstor.org/stable/pdf/20033648.

[40] US Department of the Army, Field Manual (FM) 100-5, *Operations* (Washington, DC: Government Printing Office, 1982), 1-5.

of WWII and the US Army's desire to transition from the irregular warfare of Vietnam. It was designed to decisively defeat enemy forces similar to the Napoleonic mindset, German blitzkrieg operations, MacArthur's Inchon operation, and the 1991 Gulf War.[41] Airland battle seemed to have been heavily influenced by factors in the contemporary environment, much like the current LSCO focus by the US Army.

The synthesis of SDW was extracted from research by Liang Qiao and Xiangsui Wang, *Unrestricted Warfare: China's Master Plan to Destroy America*;[42] Francois Jullien, *The Propensity of Things, and Treatise of Efficacy*;[43] David Lai, *Learning from the Stones: A Go Approach to Mastering China's Strategic Concept, Shi*;[44] and Sunzi and Samuel B. Griffith translation of Sun Tzu's *The Art of War*.[45] The overarching theme from the literature is that China views warfare as an indirect approach across all domains using exploitation, disruption, information warfare, and systems warfare. The literature review of both the United States and China's concept of warfare created a foundation that facilitated the focus of the monograph; the study of the OE that informed and defined LSCO and SDW.[46]

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[41] Carter Malkasian, "AirLand Battle and Modern Warfare" (2014 International Forum on War History, Proceedings, September 2014), 115, accessed February 12, 2021, http://www.nids.mod.go.jp/english/event/forum/pdf/2014/09.pdf.

[42] Liang Qiao and Xiangsui Wang, *Unrestricted Warfare: China's Master Plan to Destroy America* (Brattleboro, VT (Echo Point Books, 2015).

[43] Francois Jullien, *The Propensity of Things, and Treatise of Efficacy The Propensity of Things: Toward a History of Efficacy in China*, trans. by Janet Lloyd (Cambridge, MA: MIT Press, 1995).

[44] David Lai, "Learning from the Stones: A Go Approach to Mastering China's Strategic Concept, Shi" (Monograph, Army War College, Strategic Studies Institute, Carlisle, PA, 2004).

[45] Sun Tzu, *The Art of War,* trans. Samuel B. Griffith (New York: Oxford University Press, 1963).

[46] Keith Beurskens, "The Long Haul Historical: Case Studies of Sustainment Operations in Large-Scale Combat Operations," *Military Review* 98, no. 5 (September-October 2018): 34-38, accessed March 3, 2021, https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/SO-18/SO-18-Book.pdf; Thomas Bolen and Vince Carlisle, PhD, "Creating Powerful Minds: Army University Education Initiatives for Large-Scale Combat Operations," *Military Review*, 98, no. 5 (September-October 2018): 82-87, accessed February 12, 2021, https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/SO-18/SO-18-Book.pdf; Thomas G. Bradbeer, PhD, "Lethal and Non-Lethal Fires Historical Case Studies of Converging Cross-Domain Fires in Large-Scale Combat Operations," *Military Review* 98, no. 5 (September-October 2018): 27-32; Lundy, "Meeting the Challenge of Large-Scale Combat Operations Today and Tomorrow"; Mark D. Vertuli, "Perceptions Are Reality Historical

Research by the RAND Corporation and *Military Review* provided details in understanding LSCO and SDW. Journal articles from *Military Review* described and identified factors in the OE that informed the shift to LSCO. An article written by Michael Lundy in the *Military Review* characterize the OE as increasingly volatile, lethal, and complex and demands the army adapts to the likelihood of a LSCO conflict with a peer threat.[47] Two RAND Corporation research documents specifically describe the SDW concept and the factors in the OE that informed the PLA's thinking about SDW as a concept of warfare. The RAND Corporation research documents outlined the key point that the PLA's SDW is a product of a broader operating concept called "systems of systems."[48] The operating concept is organized and visualized on a multi-domain battlefield constructed of operational systems.[49] SDW denotes a confrontation and destruction of an enemy's operational systems.[50] The research created a comprehensive understanding of both LSCO and SDW to compare elements of operational art.

The central literature used to support the comparative analysis is US Army doctrine, primarily Field Manual (FM) 3-0, *Operations*, which aided in defining and describing operational art with the principle focus on three elements of operational art—tempo, culmination, and risk.[51] The three elements were used because rapid advancements in technology suggested an impact on the temporal aspect of warfare and questioned the definition of culmination and risk for the United States' Army commander. The research is from a US Army perspective and therefore viewed through the lens of US Army doctrine.

Case Studies of Information Operations in Large-Scale Combat Operations," *Military Review* 98, no. 5 (September-October 2018): 52-59.

[47] Lundy, "Meeting the Challenge of Large-Scale Combat Operations Today and Tomorrow," 112.

[48] Burke et al.; Engstrom.

[49] Burke et al., 8-9.

[50] Engstrom, iii.

[51] US Army, ADP 3-0, 1-6.

The literature review identified a fundamental difference in the way the US Army conceptualizes warfare vices China's PLA. The aim in conflict is a victory that supports the overall strategic objective or, in other words, the employment of operational art. LSCO pitted against SDW suggests a fundamental mismatch that brings into question the employment of the elements of operational art, specifically, tempo, culmination, and risk. The monograph takes a comprehensive look at the two concepts as a basis for comparative analysis. The literature review was methodological and summarized in four document categories: US Government documents, US Army Doctrine, literature from research organizations, and literature by authors who have written on American and Chinese ways of war.

Concepts of Warfare

Warfare is "the activity of fighting a war, often including the weapons and methods that are used."[52] In its simplest terms, it is how war is prosecuted. Homer, the Greek poet, with his contrast of "bie" and "metis" provides a suitable description for a general conceptualization of warfare.[53] Homer describes Bie as the pursuit of victory in the physical domain employing strength, courage, and engaging in direct confrontation with the adversary or competitor. In bei, the fighting force is willing to die with honor, suggesting an underlying rigid mindset or concept of war. The concept of metis is to seek victory in the cognitive domain, using intellect, imagination, and an indirect approach to attacking the adversary. In metis, the objective is to persist with deception.[54] Homer's distinction between bei and metis is a principal thought to understand the US Army and China's PLA thoughts on warfare.

[52] Cambridge Dictionary, "Warfare," accessed November 4, 2020, https://dictionary.cambridge.org/us/dictionary/english/warfare.

[53] Lawrence Freedman, *Strategy: A History* (New York: Oxford University Press, 2013), 43.

[54] Ibid.

US Army Concept of Warfare

The US Army concept of warfare is characterized by a decisive engagement that overthrows an adversary by the offensive employment of mass and concentration. The evolution of this concept of warfare dates back to the American Revolutionary War in the mid-1700s.[55] During the Revolutionary War, America had limited resources, limited naval power, and a small force of a continental army and militiamen to confront the well-resourced and professional British forces.[56] This military deficiency caused General George Washington, commander of the American forces, to employ a concept of attrition warfare, which was raids and attacks against military detachments and outposts to attrite British forces. Attrition warfare also meant disruption of supply routes and command nodes to exhaust British formations and force culmination.[57] However, as America grew in wealth and embraced unlimited objectives in war, its concept of attrition warfare shifted to annihilation warfare.[58]

Theoretically, the concept of annihilation warfare was primarily borne from the influences of military theorists Antoine Jomini and Carl Von Clausewitz's interpretation of the Napoleonic Wars. They viewed annihilation warfare as the achievement of battlefield victory by decisively and destructively overpowering an enemy's army and crippling their will to fight.[59] This type of warfare was offensive and required confrontation with the enemy. It also required a dominant military power. As America grew in wealth, so did its investment in its military power.

The growth of US military power fostered the ability to fight wars aimed at overthrowing the enemy.[60] This concept of warfare was symbolic of Napoleonic warfare where the principle of

[55] Weigley, xxi.

[56] Ibid., 4.

[57] Ibid., 15.

[58] Ibid., xxii.

[59] Ibid., 145.

[60] Ibid., xxi.

mass and concentration of maximum combat power was employed to achieve a decisive victory.[61] The American way of war was slowly taking form and because war was primarily land base, the US Army was indoctrinated in this way of the war characterized by a decisive engagement that overthrew an adversary by the offensive employment of mass and concentration. These characteristics could be executed on LSCO battlefield framework and thus support an army commanders' use of tempo to achieve a decisive engagement, force culmination by overthrowing an adversary with mass and concentration and assuming the inherent risk involved in direct military engagement. The advent and employment of highly technologized weaponry in more modern warfare still supported the LSCO framework and elements of operational art.

US Army Warfare Conception in Practice

Operation Desert Storm, 1991, is the most notable conflict in recent history where the US Army executed its concept of warfare on LSCO battlefield but leveraged highly technologized weaponry and air supremacy in the application of operational art. LSCO is not a new concept for the US Army. It conducted LSCO in WWII, the Korean War, and Operations Desert Storm. During these conflicts, the US Army deployed and maneuvered corps and divisional tactical formations to overthrow or annihilate an adversary. Operation Desert Storm provided an excellent example of this concept where the United States' and coalition partners decisively engaged and defeated (annihilated) Iraqi forces, the fourth largest army in the world. The infamous maneuver tactic of the "big left hook"—an enormous flanking attack against Iraqi forces near the Kuwait border, demonstrated the use of mass and concentration to force culmination of the Iraqi forces.[62] However, Operation Desert Storm also seemed to represent a transition point for the conduct of warfare.

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[61] Weigley, 213.

[62] Steven Beardsley, "Desert Storm: Largest US Tank Battle Lasted Mere Minutes and The Left Hook," *Small Wars Journal* (blog), January 16, 2016, accessed January 31, 2021, https://smallwarsjournal.com/blog/desert-storm-largest-us-tank-battle-lasted-mere-minutes-the-left-hook.

The effective use of airpower to achieve air superiority and superior technological systems suggested the impetus for perhaps a change in the application of the elements of operational art. For the US Army, the Battle of 73 Easting demonstrated how the battlefield framework was beginning to change. United States' forces, though outnumbered, quickly and decisively defeated the elite Iraqi Republican Guard Forces. The key to the victory was the United States' superior technological overmatch with thermal targeting acquisitions systems, cannons with higher caliber rounds, and sloped and angled armor vehicles that increased projectiles' deflection.[63] Operation Desert Storm as a whole, and the Battle of 73 Easting, supported the American way of war and the LSCO battlefield framework, and thus the application of elements of operational art. However, the use of highly technological weaponry impacted the outcome of the conflict and signified an evolution of a future battlefield that deviates from the LSCO framework and invariably the employment of the elements of operational art. An auxiliary point to the evolution is the United States' robust military expenditure.

In 2019, the United States military expenditure, approximately $732B, eclipsed the total expenditure, $654.8B, of the eight other countries with the largest military expenditures. The United States spent more than three times as much as China, which spent about $261B.[64] The exorbitant military expenditure has been the moniker of its global military dominance since WWI. It spent $27B, more than one-half of Britain's $47B, having only been in the war for just over a year.[65] America's investment in its military superiority anchors its way of war and

[63] Neil Fotre, "73 Easting: The Last Great Tank Battle Of The 20th Century," Coffee or Die, April 28, 2019, accessed January 31, 2021, https://coffeeordie.com/73-easting/.

[64] David Lawler, "By the Numbers: Military Spending around the World," *Axios*, April 27, 2020, accessed November 11, 2020, https://www.axios.com/defense-spending-by-country-us-china-russia-ddbcdba1-6926-434a-87d4-a8794318f3a6.html.

[65] Harvey E. Fisk, *The Inter-Alley Debts: An Analysis of War and Post-War Public Finance* (New York: Bankers Trust Company, 1924), 13, 325.

provides for future warfare technology that may change the way US Army commanders conceptualize the landscape of its military operations.

In summary, the core underpinnings of the US Army's conception of warfare are offense, annihilation warfare, technologically advanced capabilities, and a robust budget that all combine to exact military superiority in the physical domain. US Army commanders in Desert Storm exemplified the American way of war, which informed the LSCO battlefield framework and elements of operation art. However, the use of technologically advanced capabilities in Desert Storm to confront, dominate, and decisively defeat its adversary also suggested the advent of a different future battlefield. A battlefield that may require an evolution of how commanders understand, visualize, and describe the OE to plan campaigns and major operations. However, the current US Army LSCO concept still embraces Homer's strategic thought of "bei'—the pursuit of victory in the physical domain employing strength, courage, and engaging in direct confrontation with the adversary or competitor. The US Army faced an adversary that fought the same way, but future adversaries may not and may even conceptualize warfare differently.

China's View of Warfare

China's view of warfare is arguably rooted in, or at least reflects, Sun Tzu's teachings, the Art of War. The Art of War is one of the seven military classics in ancient China, and it is the oldest and most accepted military discourse in China.[66] Sun Tzu's teaching embodied the mental, economic, and deceptive approach to defeating the adversary. He references this approach in the Art of War, stating, "All warfare is based on deception . . . primary target is the mind of the opposing commander."[67] Sun Tzu focused on executing a type of warfare that sought victory below the threshold of violence.

[66] Ralph D. Sawyer, and Mei-chün Sawyer, trans., *The Seven Military Classics of Ancient China* [wu Jing Qi Shu] (Boulder, CO: Westview Press, 1993), 149.

[67] Sun Tzu, 41.

Sun Tzu understood that violence is a part of warfare but believed that the commitment of military forces to pursue violence should be a last resort. He believed that the cost of war, especially protracted warfare, consumed resources, human capital and infrastructure, and did not benefit the state. Therefore, to ensure violence is a last resort, he encouraged warfare to be waged in all forms, with all tools, across all boundaries and domains, and the exploitation of the propensity of things or "shi". The meaning of shi, though ambiguous, is "the alignment of forces . . . potential born of disposition,"[68] or "position or circumstances . . . power or potential."[69] In essence, shi is leveraging the opportunities that arise from circumstances and the natural potential that exist within dispositions. Shi is anchored in Chinese thoughts of warfare.

The concept of shi permeates the use of primarily non-kinetic execution of MDO, cognitive domain operations, deception operations, information warfare, cyber warfare, economic subjugation, and other tools to protect and develop China's Republic. It is this holistic approach that is at the core of China's "integrated strategic deterrence." Integrated strategic deterrence is a multidimensional set of military and non-military capabilities that combine to constitute the posture required to protect Chinese national security interests.[70] For example, China extends its influence by reinforcing its relationships with Europe, Eurasia, Central, West, and South Asia, and Latin America. The expansion of trade and investments via its Belt and Road Initiative helped extend its economic footprint and global influence.[71] China's concept of warfare is holistic. It leverages every tool, domain, strategy, and instrument of national power, to avoid confrontation and ensure violence is a last resort. This theme is codified in their military operations.

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[68] Lai, vi.

[69] Jullien, 12.

[70] Michael S. Chase and Arthur Chan, *China's Evolving Approach to "Integrated Strategic Deterrence"* (Santa Monica, CA: RAND Corporation, 2016), vii.

[71] Nicole Peterson, ed. "Chinese Strategic Intentions: A Deep Dive into China's Worldwide Activities" (A Strategic Multilayer Assessment (SMA) White Paper, December 2019), viii-ix.

China's Military Employment

China's military employment seeks to avoid force on force commitment by employing the concept of active defense, executing information warfare, cognitive domain operations, and SDW. The concept of active defense underpins China's military strategy. Active defense is the leveraging of more extended range, precision-guided munitions to create maximum standoff or access denial of a potential enemy from "China's coastal areas by fighting a "noncontact," short, sharp conflict like the Persian Gulf War."[72] Though China's goal is to build a combat-effective force capable of winning regional conflicts, its response to aggression would be considered a justifiable defense. Therefore, active defense includes orders to deescalate a conflict and seize the initiative during a conflict in the event of justifiable defense. However, China primarily executes a more non-kinetic approach in the form of information warfare, cognitive domain operations and their current operating concept of SDW.

The PLA considers information the critical enabler and uses the term "informatization" to become a modern military endeavor. This term is listed in their doctrine and extends to the execution of "informatized warfare"—the acquisition, transmittal, and use of information to conduct MDO in conflicts.[73] One such domain being explored by the PLA is the cognitive domain.

The PLA seeks to employ cognitive domain operations, the next-generation evolution of psychological warfare, to influence an adversaries' cognitive function, both in peacetime and wartime decision-making. The PLA's cognitive domain operations framework is two-pronged: the use of cognitive influence technology and the use of subliminal cognitive influence technologies. The PLA leverages cognitive influence technology to assess the adversary's psychological disposition and conduct attacks against the adversary's psychological well-being

[72] Defense Intelligence Agency, *China Military Power*, 3.

[73] Ibid., 23.

all while improving its cognitive abilities. The use of subliminal cognitive influence technologies is to collect and pre-treat subliminal information content, implant subliminal messages into content, create synthetic information and defend against an adversary's use of subliminal messaging.

PLA is now developing offensive strategies and capabilities to influence an adversary's public opinion. An example of this is the political interference in Taiwan's November 2018 elections and the summer 2019 disinformation campaign against Hong Kong protesters. These technological efforts are credible indicators that the PLA is seeking to employ real-world applications of cognitive domain operations. For example, the PLA has started patenting technologies dealing with the cognitive domain.[74] Additionally, PLA documents emphasize attacking networks or conducting systems warfare designed to blind and deafen the enemy.[75]

The PLA's emphasis on systems warfare is described in a study conducted in 2018 by the RAND Corporation, which stated that "China's PLA now characterizes and understands modern warfare as a confrontation between opposing operational systems rather than merely opposing armies."[76] Another research report by the RAND Corporation highlighted the SDW stating, "Systems thinking has pervaded every aspect of the PLA's approach to training, organizing, and equipping for modern warfare." Additionally, it outlined that big data and artificial intelligence signified a new era of warfare.[77] The PLA also enforces other non-LSCO efforts.

China's concept of warfare is informed by Sun Tzu teachings that encourage an indirect approach to warfare; the concept of active defense, information warfare; cognitive domain

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[74] Nathan Beauchamp-Mustafaga, "Cognitive Domain Operations: The PLA's New Holistic Concept for Influence Operations," *China Brief* 19, no. 16 (September 2019): 2, 4, 7, accessed January 31, 2021, https://jamestown.org/program/cognitive-domain-operations-the-plas-new-holistic-concept-for-influence-operations/.

[75] Defense Intelligence Agency, *China Military Power*, 43.

[76] Engstrom, iii.

[77] Burke et al8.

operations, and the idea of shi. China's warfare concept seems to embrace metis, which is the pursuit of victory over the adversary by an indirect direct approach. China's thoughts on conflict do not suggest a LSCO battlefield framework. However, it may be problematic for the United States to leverage the elements of operational art in a conflict with an adversary that employs an indirect approach to warfare.

Influence from the Contemporary Operational Environment

The contemporary OE is primarily characterized by rapid advancements in technology which formed the US Army's LSCO concept and the PLA's SDW. More importantly, the speed of technological developments indicates a different course of warfare that the current definitions of the elements of operational art may not support.

Technological advancements have informed LSCO and SDW warfare concepts in three significant areas: time (speed), space (domain), and resources (organizational training and equipment). In terms of time, technology has sped up the decision-making process. Decision-making requires sorting through large amounts of data in the shortest amount of time to gain useful intelligence to achieve relative advantage over the adversary.[78] The scope of technological advancement changed the concept of physical space or domain. Space is no longer the traditional land, air, sea domains of warfare, but has evolved to include cyberspace and outer space.[79] Technology has always had a bearing on warfare. However, in today's environment the sheer rapidity of its evolution is faster than it has ever before and has made the contemporary OE more complexed and has impacted the time, space, and resources of warfare concepts—LSCO and SDW.

The technological advancements in the information domain demonstrate how time has changed warfare, particularly the decision-making process and military operations. The speed of

[78] Beauchamp-Mustafaga, 2, 4, 7.

[79] Burke et al., 8-9.

processing and disseminating of information has made it increasingly available, almost instantaneously, from anywhere, anytime, and across numerous echelons of military formations. Information facilitates the decision-making process, the employment of combat power, and enhances the US Army's ability to seize, gain, and retain the initiative and consolidate gains in the operational environment.[80] Additionally, adversarial actors have gained significant abilities to disrupt, manipulate, distort, and deny information.[81] For example, the United States observation of the Russian execution of integrated information warfare during its illegal annexation of Crimea and invasion of eastern Ukraine in 2014, provided a precursor that informed the operational environment of the LSCO battlefield.[82]

The proliferation of capabilities by United States' adversaries and competitors in space and cyberspace domains has increased the scope of the battlefield beyond the traditional domains of air, land, sea, and information. This proliferation challenges the United States military's competitive advantage by fielding capabilities that deny freedom of action in the air, land, maritime, space and cyberspace domains and diminish the United States' ability to influence critical regions of the world.[83] The advent of this threat prompted the US Army to shift its focus to LSCO to be able to compete across the full range of military operations.[84]

As for resources, potential adversaries leveraged modern technology to improve fires' capabilities, advance military systems and networks, and trained and equipped forces at echelons. Technology modernized the fires' capabilities of actors improving their weapons systems' range, precision, multi-domain capability, and the ability to increase their anti-access and area denial

[80] US Department of the Army, Field Manual (FM) 3-13, *Information Operations* (Washington, DC: Government Publishing Office, 2016), 1-1.

[81] Vertuli, 53-54.

[82] Ibid., 56.

[83] US Army, FM 3-0, 1.

[84] Ibid.

capabilities.[85] As for systems and networks, actors invested and leveraged capabilities that destroy or cause failure to US Army systems.[86] This prompted the US Army to assess its ability to conduct LSCO and in the process, recognized significant capability gaps in terms of fires, including air and missile defense, counter-mobility, protection, and aviation.[87]

All these technological advances re-shaped the concept, or interrelationship, between time, space, and resources in warfare. The speed, volume, and access to information meant faster decision-making for commanders across a truncated space with little resources. Fires' capabilities created distance between the US Army and potential adversaries. System and Networks supported a more connected cross-domain battlefield that lessoned time and shared resources. Adversarial actors' ability to modernize and operationalize these capabilities degraded the US Army's competitive advantage and fostered an increasingly volatile OE.[88] The US Army has characterized this increasingly volatile OE as potentially lethal, destructive, and complex; a characterization it associates with LSCO.[89]

Technological advancements informed the evolution of SDW in information systems and the United States' innovative use of information systems in post-Cold War conflicts. Its evolution pervaded time, space, and resources.[90] The PLA recognized the importance of information, not only as a domain but also the mode of warfare between information-based systems-of-systems. President Xi Jinping codified this focus on information systems in 2015 when he directed the PLA to win "Informatized Local Wars."[91]

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[85] Bradbeer, 28.

[86] US Army, FM 3-0, 1-11.

[87] Dennis S. Burket, ed., *Large-Scale Combat Operations: The Division Fight* (Fort Leavenworth, KS, Army University Press, 2019), 151.

[88] Lundy, "Meeting the Challenge of Large-Scale Combat Operations Today and Tomorrow," 111.

[89] US Army, FM 3-0, 1-2.

[90] Engstrom, iii.

[91] Burke et al., 5.

Informatized warfare facilitated time and space in the PLA's acquisition, transmission, processing, and use of information during a conflict.[92] Xi envisaged informatized operations in the context of systems destruction warfare because it supported political objectives and controlled the scope and scale of conflicts.[93] Furthermore, informatized operations demonstrate the concept shi in that the PLA has leveraged the propensity of information and the opportunities that exist in using information throughout the entire process of acquisition, transmission, processing and use. The PLA's ability to leverage these opportunities across all domains, not just the information domain, allows the PLA to maximize the importance of information.

The use of information systems by the United States in post-Cold War conflicts also informed SDW. The United States in post-Cold War conflicts demonstrated the revolutionary role of information systems in the context of their ability to disrupt, paralyze, or destroy the operational capability of the enemy's operational system.[94] Operation Desert Storm, Operation Allied Force, and Operation Iraqi Freedom are examples of wars in which control over information equated to maintaining the initiative in a technological theater of war.[95] These examples influenced the PLA's overarching concept of system thinking and system confrontation, guiding principles of SDW.[96] The PLA assessed that using SDW in modern warfare reduced the need for armies to confront or annihilate each other on physical battlefields. Instead, SDW aims to achieve victory through comprehensive dominance across all domains.[97] In addition to all domain execution, the PLA's SDW concept is also resourced to disrupt the adversary's operational architecture's time sequence and/or tempo.[98]

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[92] Burke et al., 5.

[93] Ibid., 6.

[94] Burke et al., iii.

[95] Ibid., 7.

[96] Engstrom, ix.

[97] Ibid., x.

[98] Ibid.

The speed of technological development informed the US Army's LSCO concept and the PLA's focus on SDW. However, it also seemed to have, for the US Army, re-hashed a conventional approach to warfare with the shift to LSCO, and for the PLA a more futuristic approach to warfare. Arguably, US Army doctrine of operational art potentially may not have changed much with the LSCO concept. However, the PLA may have updated doctrine that does not subscribe to the LSCO framework and therefore does not present an opportunity for the employment of the elements of operational art. A practical comparative analysis of LSCO and SDW may offer some insight into the application of operational art.

Analysis Using Three Elements of Operational Art

Bei characterizes LSCO and pervades the ideas of confrontation, strength, courage, and the offensive mindset that seeks to overthrow an adversary primarily in the physical domain. An operational environment of rapid technological advancements that gave rival nations peer or near-peer status to compete militarily informed the focus of LSCO.

SDW embodies metis to seek victory in the mental domain, uses intellect, imagination, and an indirect approach to attack the adversary; the objective is to persist with deception. SDW is underpinned by the idea of shi, which is the potential born of disposition. The shi mindset facilitates the PLA's motivation to seize opportunities from the dynamics of the environment, wage disruption, and exploitation and seek to influence and operate below the level of all-out war. SDW was also informed by an operational environment characterized by rapid technological advancements, which gave China and the PLA the capabilities to compete militarily, but more importantly, in the information space under the hospice of systems of systems.

Suppose the United States and China fall into the Thucydides trap and war ensues. What challenges would the US Army face in applying the elements of operational art of tempo, culmination, and risk to support or contribute to the national objective ultimately? Given that the rapidity of technological advancements has significantly impacted time, space, and resources in

warfare, it is prudent to use them to support the discourse of these three elements of operational art.

The manipulation of tempo facilitates the rate of military actions, and commanders generally seek to sustain a higher tempo to overpower an enemy force. Tempo as defined in Army Doctrine Publication (ADP) 3-0 is "the relative speed and rhythm of military operations over time with respect to the enemy."[99] The US Army is an expeditionary force, therefore, LSCO would most likely be fought abroad. To conduct expeditionary operations requires the employment of speed and responsiveness to deploy overseas with enough combat power to prevent aggression or decisively defeat the enemy. During the Cold War, the US Army had an extensive global footprint, allowing for a quick response to global operations. However, after the Cold War, they reduced their global footprint at the expense of responsiveness and would need to deploy a greater number of forces from the US mainland, creating a large operational systems footprint.[100]

The US Army would have a time and space problem in maintaining tempo against the PLA's SDW since it operates in the physical domains. The challenge with a reduced global footprint is that US Army forces must deploy from the continental United States to the Indo-Pacific region. Defender Pacific, a division-size deployment readiness exercise from the United States to the Indo-Pacific was intended to address that problem and augment the current 85,000 military personnel already permanently stationed in the Indo-Pacific region.[101] The attacks of SDW may significantly diminish the tempo needed for a credible power projection into the region. One of the objectives of the PLA's SDW is to disrupt the time sequence and/or tempo of

[99] US Army, ADP 3-0, 2-8.

[100] Robert Leonhard, *Fighting by Minutes: Time and the Art of War*, 2nd ed. (CreateSpace, 2017), 9.

[101] Jen Judson, "US Army Wants $364 Million for Defender Pacific in FY21," *Defense News*, February 25, 2020, accessed March 27, 2021, https://www.defensenews.com/land/2020/02/25/army-wants-364-million-to-put-on-defender-pacific-in-fy21/.

the adversary's operational planning. SDW emphasizes striking selectively and precisely at the enemy's operational systems to control and paralyze those systems to force the loss of resistance capabilities.[102] This creates a challenge for the US Army to mass forces of corps and divisions and deploy to the region under attack from SDW across all domains. Additionally, the PLA anti-access and area denial capabilities, mentioned earlier creates challenges in generating the tempo needed to overpower and dominate an enemy force, synonymous with the American way of war.

The depiction of the US Army's execution of tempo in the above may seem superficial and very rudimentary. However, even this simple example demonstrates that attacks on the army's operational systems may create difficulties for a US Army commander to seize the land domain and create the relative speed and rhythm with respect to an "unseen" enemy to achieve the military ends and strategic objective. Therefore, maybe the definition of tempo for the US Army in future warfare may not just be with respect to an enemy. The challenge with tempo extends to further challenges with the element of operational art of culmination.

LSCO is confrontational and seeks to overpower or dominate the adversary and force them to culminate. SDW sees warfare not as opposing forces but as pervasive confrontations of operational systems. Culmination is defined in Army Doctrine Publication 3-0 as "a point at which a force no longer has the capability to continue its form of operations, offense or defense."[103] Chinese thinking on warfare is indirect, deceptive, and operates below the threshold of armed conflict. Therefore, this suggests that SDW will not provide a culminating point as defined by US Army doctrine. In a conflict that pervades indirect, non-kinetic, systems focus, the challenge for the US Army becomes defining culmination to link military objective to support national objectives effectively. The difficulty in forcing culmination can be reflected in the context of time, space, and resources.

[102] Burke et al., 8.

[103] US Army, ADP 3-0, 2-9.

Time relative to LSCO has been seen as military operations that seek quick and decisive victory. Operation Desert Storm epitomizes quick and decisive victory by lasting only 100 hours against what was then the fourth-largest Army in the world.[104] Though previous US Army LSCO conflicts were not quick or decisive, it is essential to remember that the American way of war was forged by the Napoleonic mindset of quick and decisive wars. Contrarily, SDW has underpinnings of Mao's military theory of using guerrilla tactics of trading space for time, in essence, protracted warfare.[105] If the PLA maintains this mindset of protracted warfare, SDW with its all-domain approach, could sustain engagements for a long period; a scenario that may be like the wars in Iraq and Afghanistan except on battlefields of operational systems. Additionally, the PLA's opportunistic (shi), and disruption and exploitation tactics below the level of armed conflict could also extend the time it takes for them to reach any culminating point given that their objective is to persist with deception.

As for space, the US Army's LSCO is primarily focused on the physical domains (land, air, and seas) while as mentioned several times before, SDW is all-domain. This all-domain capability reverberates the Chinese military strategist description that "the present-day combat space is smaller and more limited than before, while the war space has expanded into new domains because of new technologies."[106] This smaller combat space suggests the insignificance of the word "large" in large-scale combat operations. Additionally, the expansion into new domains widens the scope for culmination and therefore creates the challenge of forcing the PLA to culminate.

Resourcing for LSCO versus SDW also creates challenges for the US Army in the conceptualization of culmination. Recall from earlier, the term resource means the requisite

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[104] Steven Beardsley, "Mother of all Battles Lasted Only 100 Hours," *Stars and Stripes*, accessed March 27, 2021, https://www.stripes.com/news/special-reports/the-gulf-war-25-year-anniversary/100-hours.

[105] Burke et al., 2.

[106] Ibid., 13.

training and equipment are provided at the appropriate echelons of military formations to conduct operations. The primary audience for LSCO and SDW training are military leaders. Both the US Army and the PLA acknowledge the importance of trained military leaders to conduct their concepts of warfare and have restructured their leadership training curriculums to provide the requisite training at each echelon. For example, there are already changes in the US Army's Captain Career Course and Command and General Staff College's curriculum to accommodate LSCO principles.[107] The PLA professional education contains lessons learned from the United States' performance in contemporary conflicts, and system-of-systems confrontation.[108] However, in the equipment arena at echelons, the US Army identified the seventeen critical organizational capability/capacity gaps that require attention in order to prevent defeat or detrimental losses.[109] These gaps suggest that the US Army may be the force that culminates first. As for SDW, PLA has fully invested in training, organizing, and equipping for modern warfare at all levels.[110] The element of tempo and culmination underpins the element of risk for the US Army.

The risk for the US Army LSCO against SDW is embodied in the operational role of the Army in time, space, and resources. Risk is defined under the auspice of operational art as "the probability and severity linked to hazards."[111] However, in comparing LSCO and SDW the definition of risk needs expansion. Army Training Publication 5-0.1 defines risk as "uncertainty, and chance inherent in all military operations."[112] The role of the army's military operations is "to gain, sustain and exploit control overland to deny the use to an enemy."[113] Confronting an

[107] Bolen, and Carlisle, 83.

[108] Burke et al., 5.

[109] Burket, 11.

[110] Burke et al., 8.

[111] US Army, ADP 3-0, 2-11.

[112] US Army, ATP 5-0.1, 5-8.

[113] US Army, FM 3-0, 1-3.

enemy that focuses on system destruction and not an opposing army creates a fundamental risk for the US Army's ability to execute its role. This may seem supercilious, however how does the army exploit control overland to deny an enemy when the enemy does not primarily fight in a LSCO framework. This may suggest that the challenge for the US Army is to shift its thoughts on operational risk from land operations and to more systems operations. The rise of artificial intelligence (AI) does give merit to this idea from a time and resource perspective.

The use of unmanned aerial vehicles has helped to add flexibility, resilience, and lethality to the military force. AI has helped to spark the discussion of robots operating in the air, on land, underwater in support of military missions. AI is among the many advancing technologies that will change the character of warfare for future generations. The use of AI in conflict is envisaged as enabling autonomous systems to conduct missions, achieving sensor fusion, automating tasks, and making better, quicker decisions than humans.[114] In terms of time, artificial intelligence and machine cognition has enabled automated decision making with speed being the currency of action.[115] Nation's, such as China and Russia are expending a significant amount of money in the field of AI.

China has vowed to achieve AI dominance by 2030. It is already the second-largest R&D spender, accounting for 21 percent of the world's total of nearly $2 trillion in 2015. The United States ranks at 26 percent. If recent growth rates continue, China will soon become the biggest spender. If China makes a breakthrough in crucial AI technology—satellites, missiles, cyber-warfare, or electromagnetic weapons—it could result in a major shift in the strategic balance. The Russian Military Industrial Committee has approved a plan that would have 30 percent of Russian

[114] Mary Cummings, "Artificial Intelligence and the Future of Warfare" (Research Paper, International Security Department and US and the Americas Programme, Chatham House, January 2017), 2-13.

[115] John Allen, and Amir Husain, "On Hyperwar," *Proceedings* (July 2017): 3, accessed February 12, 2021, https://www.usni.org/magazines/proceedings/2017/july/hyperwar.

combat power consisting of remote-controlled and autonomous robotic platforms by 2030.[116] Such a trend calls into question the future of operational risk in the land domain for formations. Perhaps, more importantly, will AI and machine cognition push warfare away from LSCO towards a future battlefield of system destruction warfare?

Conclusion

The challenges the US Army faces with LSCO against SDW require rethinking the elements of operational art. The US Army shifted its focus to LSCO to address a different operational environment with peer and near-peer adversaries.[117] LSCO was the response to the return of great power competition in which a competitive emergent China challenged the established political, economic, and military dominance of the United States. This emergent challenger created the potential for conflict, and the DoD response prioritized counteracting China's military capabilities as the top priority. However, China's PLA does not focus on LSCO but instead focuses on SDW which denotes a confrontation and destruction of an enemy's operational systems across all domains.

The monograph used three elements of operational art, tempo, culmination, and risk, to compare LSCO and SDW to assess challenges for the US Army. The purpose of using elements of operational art is because it is the nucleus of military operations. Operational art helps to guide commanders in linking the desired military end state to the effective accomplishment or support of the national or strategic level objectives.

The US Army has a problem in maintaining tempo if it thinks only in terms of employing forces in the physical domain. The United States reduced its global footprint of forces after the

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[116] William Middendorf, "Opinion/middendorf: Artificial Intelligence and the Future of Warfare," *The Providence Journal* (November 28, 2020), accessed February 28, 2021, https://www.providencejournal.com/story/opinion/columns/2020/11/28/opinion-artificial-intelligence-and-future-warfare/6382288002/.

[117] US Army, FM 3-0, 2.

Cold War, requiring it to deploy forces from the continental United States to the Indo-Pacific region (force projection) to support a potential conflict. However, the PLA's SDW objective is to disrupt the time sequence and/or tempo of the adversary's operations, including force projection. This creates a challenge for the US Army to mass forces of corps and divisions and deploys to the region under attack by system destruction operations across all domains. Additionally, the PLA anti-access and area denial capabilities create challenges in generating the tempo needed to overpower and dominate an enemy force, a characteristic synonymous with the American way of war.

There are also challenges with the element culmination. SDW sees warfare as confrontation of operational systems. Chinese thinking on warfare is indirect, deceptive, and emphasizes operations below the threshold of armed conflict. Therefore, this suggests that SDW will not provide a culminating point but instead uphold Mao's military writings of protracted warfare. Additionally, the PLA's opportunistic, disruptive, and exploitation tactics below armed conflict could also extend the time it takes to reach any culminating point. As for space, the US Army LSCO is focused primarily on the physical domains. The advent of new technology has made today's combat space smaller but has simultaneously expanded the space of war into new domains.

Resourcing associated with LSCO in comparison to SDW also poses challenges for the US Army. In a LSCO study, conducted by the US Army, seventeen critical organizational capability/capacity gaps were identified. The gaps required attention to prevent defeat or detrimental losses to the US Army. Furthermore, the challenge to the US Army with LSCO against SDW, is that the concept of risk may be more systems-focused rather than land operations-focused given the rapid advancements in AI and machine cognition. Trends in future warfare may also create challenges for US Army and LSCO as a future concept of warfare.

A suggestion for further research is to examine the impact of warfare trends such as megacities and subterranean dimensions and hyperwar and mosaic warfare which are changing

the character of future conflict and potentially require further redefining elements of operational art.[118] The growth of megacities and the re-emergence of subterranean warfare pose challenges for US Army leaders. These land dimensions of warfare will require a specialized force with specialized training and equipment to confront these land dimensions' challenging demands effectively. Furthermore, another characteristic of future warfare seems to be decision-centric operations led by a smaller force package. This force package is responsive and agile enough to repeatedly replicate perfectly coordinated strikes to a precise point of the enemy's decision cycle. Warfare seems to be going in a direction where it is no longer about dominance in land domain but instead about influence and systems to achieve and sustain an advantage against an adversary.

[118] Middendorf, 37, 53; Allen, and Husain, 3; Bryan Clark, Dan Patt, and Harrison Schramm, *Mosaic Warfare: Exploiting Artificial Intelligence and Autonomous Systems to Implement Decision-Centric Operations* (Center for Strategic and Budgetary Assessment, February, 2020), 16, accessed February 12, 2021, https://csbaonline.org/research/publications/mosaic-warfare-exploiting-artificial-intelligence-and-autonomous-systems-to-implement-decision-centric-operations/publication/1.

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