American Information Collection Operations in the European Theater of Operations in World War II: Lessons for Military Intelligence in Future Large-Scale Conflicts

A Monograph

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The United States military is in a state of uncertainty as it prepares for operations in large-scale combat operations (LSCO) against near-peer adversaries where competition exists in all warfighting domains. This competition poses new threats to the US military's ability to conduct effective information collection (IC) operations, which threatens the quality and quantity of valuable intelligence to commanders and planners. The military lacks contemporary examples of American IC in LSCO as the last large-scale conflict against a peer adversary America fought was World War II. Despite the 76-year gap, US Army's IC in World War II provides valuable lessons for future leaders' consideration in future LSCO. These lessons include the importance of intelligence collaboration with allies and partner nations, flexibility in overcoming intelligence manning shortcomings, and the accessibility of intelligence gathering organizations for supported units.

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Abstract

American Information Collection Operations in the European Theater of Operations in World War II: Lessons for Military Intelligence in Future Large-Scale Conflicts, by MAJ Matthew J. Krivensky, 39 pages.

The United States military is in a state of uncertainty as it prepares for operations in large-scale combat operations (LSCO) against near-peer adversaries where competition exists in all warfighting domains. This competition poses new threats to the US military's ability to conduct effective information collection (IC) operations, which threatens the quality and quantity of valuable intelligence to commanders and planners. The military lacks contemporary examples of American IC in LSCO as the last large-scale conflict against a peer adversary America fought was World War II. Despite the 76-year gap, US Army's IC in World War II provides valuable lessons for future leaders' consideration in future LSCO. These lessons include the importance of intelligence collaboration with allies and partner nations, flexibility in overcoming intelligence manning shortcomings, and the accessibility of intelligence gathering organizations for supported units.

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Abbreviations

A2/AD	Anti-Access and Area Denial
ACAS	Assistant Chief of Staff
ACE	Analysis Control Element
ADP	Army Doctrinal Publication
AI	Air Intelligence Branch (Great Britain)
AI	Artificial Intelligence
ARCO	Air Reconnaissance Coordinating Officer
BCT	Brigade Combat Team
CAOC	Combined Air Operations Center
CENTCOM	Central Command
CIA	Central Intelligence Agency
CM	Collection Management
CoIST	Company Intelligence Support Team
COMSEC	Communications Security
COSSAC	Chief of Staff to the Supreme Allied Commander
CP	Command Post
DARPA	Defense Advanced Research Projects Agency
DoD	Department of Defense
EMIB	Expeditionary Military Intelligence Brigade
EPW	Enemy Prisoner of War
ETO	European Theater of Operations
FM	Field Manual
FVEY	Five Eyes
GCCS	Government Code and Cypher School

GEOINT	Geospatial Intelligence
HUMINT	Human Intelligence
IC	Information Collection
IEW	Intelligence and Electronic Warfare
IMINT	Imagery Intelligence
ISR	Intelligence, Surveillance, and Reconnaissance
JCS	Joint Chiefs of Staff
JIC	Joint Intelligence Committee
JP	Joint Publication
JPRC	Joint Photographic Reconnaissance Committee
JSTARS	Joint Surveillance and Target Attack Radar System
JWICS	Joint Worldwide Intelligence Communications Systems
LSCO	Large-scale Combat Operations
MID	Military Intelligence Division
MIS	Military Intelligence Services
MIST	Military Intelligence Support Team
OPCON	Operational Control
OSS	Office of Strategic Studies
PED	Processing, Exploitation, and Dissemination
PIU	Photographic Intelligence Unit
PRU	Photoreconnaissance Unit
RAF	Royal Air Force
SHAEF	Supreme Headquarters Allied Expeditionary Force
SIGINT	Signals Intelligence
SIS	Special Intelligence Service (Britain)

SIS	Signal Intelligence Service (American)
SOE	Special Operations Executive
SSA	Signal Security Agency
SSO	Special Security Officer
TAC	Tactical Air Command
TCO	Technical Control Office
TIS	Theater Intelligence Service
TMID	Theater Military Intelligence Brigade
UAV	Unmanned Aerial Vehicle
USAAF	United States Army Air Forces
USAICoE	United States Army Intelligence Center of Excellence
VHF	Very High Frequency

Introduction

The United States military is in a state of uncertainty as it prepares for operations in large-scale combat operations (LSCO) against near-peer adversaries with competition in all five warfighting domains.[1] The intelligence enterprise is adjusting to evolving threats through advances in technology and unit restructuring. In this period of uncertainty, a prevailing challenge for the military is innovating and preparing for conflicts based on theory and methods that are unproven in and applying them to future LSCO environments. The last large-scale conflict against peer competitors in which America fought in was World War II. This monograph considers what if any lessons the US Army can learn about planning intelligence-gathering operations in future LSCO conflicts, against peer adversaries, from American information collection (IC) and collection management (CM) operations in the European Theater of Operations (ETO).[2] As it was the last large-scale conflict against a near-peer adversary, World War II contains valuable IC lessons that military leaders must account for while preparing for future large-scale conflicts.

During the United States' enduring presence in Iraq and Afghanistan, the limited scale of operations and the established architecture of command posts (CPs) allowed military leaders access to an abundance of intelligence. Lower echelon units, such as brigade combat teams

[1] Land, Maritime, Air, Space, and the information environment, which includes cyberspace and the electromagnetic spectrum. US Department of Defense, Joint Staff, Joint Publication (JP) 3-0, *Joint Operations, Incorporating Change 1* (Washington, DC, Government Publishing Office, 2018), xv.

[2] The US Army accomplishes intelligence gathering through information collection (IC), which, according to ADP 2-0, *Intelligence*, is the "activity that synchronizes and integrates the planning and employment of sensors and assets, as well as the processing, exploitation, and dissemination systems in direct support of current and future operations." Units manage their role in the IC process through collection management (CM). JP 2-0 defines CM as "the task of analyzing requirements, evaluation available assets (internal and external), recommending taskings to the operations staff for (IC) assets, submitting requests for information adjacent and higher collection support, and assessing the effectiveness of the (IC) plan." US Department of Defense, Joint Staff, Joint Publication (JP) 2-0, *Joint Intelligence* (Washington, DC: Government Publishing Office, 2013), II-6-II-7; US Department of the Army, Army Doctrine Publication (ADP) 2-0, *Intelligence* (Washington, DC: Government Publishing Office, 2019), 5-4.

(BCT), had increased access to Intelligence, Surveillance, and Reconnaissance (ISR) assets typically assigned to support higher echelon collection management requirements. Unfettered access to all warfighting domains allowed a constant flow and sharing of information and intelligence across organizations.[3] Finally, the intelligence enterprise outsourced much of the processing, exploiting, and disseminating (PED) process to organizations out of the theaters of operations to supplement the organic capabilities of units in theater. In a LSCO environment against a peer adversary, these advantages may not be present.

During the Second World War, militaries faced challenges projecting how emerging technology and tactics would define future conflicts. Although military leaders thoroughly prepared for war, they had to adjust to the realities they faced once warfare commenced. The United States underwent many reforms and debates during the interwar period between World War I and World War II and adjusted its doctrine for what it believed would prepare the force best for future conflicts. After learning lessons from British intelligence operations and their experience once America entered World War II, the US military found out the importance of adapting its intelligence operations to wartime conditions. American IC operations in World War II illustrate the importance of multi-national intelligence cooperation, the challenges of managing intelligence personnel shortages, and the benefits of having intelligence-gathering organizations accessible to units in the field.

Literature Review

Historical literature provides valuable insight into information collection activities in World War II without applying lessons for future combat operations. US Army Center of Military History publications such as John Finnegan and Roman Danysh's *Military Intelligence* and the

[3] Michael D. Lundy, "Meeting the Challenge of Large-Scale Combat Operations Today and Tomorrow," *Military Review Special Edition* 98, no. 5 (September-October 2018): 112, accessed 24 March 2021, https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/SO-18/SO-18-Book.pdf.

United States Army Intelligence Center of Excellence's (USAICoE) *The Evolution of American Military Intelligence* both provide historical narratives of American military intelligence, including a broad overview of IC activities in World War II. Publications such as these are excellent sources for understanding American intelligence operations throughout but lack the specificity required to develop lessons for future military applications.

Dissertations and theses from US military service academies are detailed sources of military history from military professionals' perspectives. In 1964, US Army Command and General Staff College (CGSC) student Major Jared Schopper wrote: "The Collection and Processing of Combat Intelligence as Performed by the US Army During Operations in Northern Europe." His thesis provides detailed accounts of the entire information collection process, from directing the US Army collection efforts to processing the data at the field army level.[4] Other dissertations and theses produced by US military students at numerous service schools provide detailed historical accounts of information collection operations across all intelligence disciplines during World War II.[5]

US military doctrine projects the current military operating environment towards future large-scale operations. Of note, ADP 2-0 ends the first paragraph of Chapter 1 by stressing that "To understand Army intelligence, it is important to understand intelligence within the larger context of [LSCO]."[6] ADP 3-0, *Operations,* notes the importance of "sharing of information and

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[4] Jared B. Schopper, "The Collection and Processing of Combat Intelligence as Performed by the US Army During Operations in Northern Europe" (MMAS Thesis, US Army Command and General Staff College, Ft. Leavenworth, KS, 1964).

[5] United States Air Force (USAF) officers Lieutenant Colonel Tyler Morton's 2016 dissertation "From Kites through Cold War: The Evolution of United States Air Force Manned Airborne ISR" and Major David Dengler's 1998 thesis "Seeing the Enemy: Army Air Force Aerial Reconnaissance Support to U.S. Army Operations in the Mediterranean in World War II" provide in depth historical detail about aerial reconnaissance in World War II. Major Jeffrey Harley's 1980 thesis "Reading the Enemy's Mail: The Origins and Development of U.S. Army Tactical Radio Intelligence in World War II, European Theater of Operations" is a great source for firsthand accounts of SIGINT operations from both the Allied and German perspectives in World War II.

[6] US, Army ADP 2-0, 1-1.

intelligence" during multi-national operations.[7] Current military doctrine is an excellent example of how military leaders believe current and emerging trends will shape future operating environments.

This monograph fills the gap between history and doctrine for future LSCO environments. Analyzing information collection operations in World War II from a contemporary lens provides relevant lessons learned in LSCO that America's recent conflicts cannot provide. In Major Brian Chavis' 2019 monograph *Fighting for Intelligence: Preparing Division Intelligence Operations for Large Scale Combat,* he briefly uses World War II as a case study to provide lessons for future division intelligence section operations in LSCO. He wrote, "studying history can provide some insights on what to expect and possibly how to mitigate some of the challenges intelligence sections must manage during large-scale combat."[8] This monograph follows a similar model by exploring information collection operations in World War II to gain insights on future challenges for military leaders' consideration.

To fill the gap between history and doctrine, this study explores how the US military intelligence enterprise evolved to maximize IC and CM's effectiveness in the ETO of World War II. This paper focuses on the ETO as it had the largest concentration of US Army land forces, which provides more robust examples of US Army operations than the Pacific Theater of Operations. The land-centric warfare of the ETO provides examples of challenges faced by large echelon forces arrayed across a large battlespace, constantly under threat of a land-based peer competitor. Future research on the Pacific theater could provide similar lessons with more relevance towards the US military's other services.

This paper first considers the state of American intelligence during the pre-war period,

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[7] US Department of the Army, Army Doctrine Publication (ADP) 3-0, *Operations* (Washington, DC: Government Publishing Office, 2019), 1-8.

[8] Brian D. Chavis, "Fighting for Intelligence: Preparing Division Intelligence Operations for Large Scale Combat" (Masters Monograph, School of Advanced Military Studies, US Army Command and General Staff College, Ft. Leavenworth, KS, 2019), 33.

which may be analogous to the period in which America currently finds itself, before exploring British and American military intelligence agencies during the war, which provides insight into the important consideration of multi-national intelligence cooperation. The World War II case studies conclude by examining two specific intelligence-gathering disciplines: aerial reconnaissance and signals intelligence (SIGINT). Aerial reconnaissance and SIGINT were emerging trends for American intelligence and are excellent case studies for how the military adapted to immature technology and fields of intelligence. By ordering the case studies as outlined above, this monograph flows through the information collection process, from the intelligence-gathering agencies to the delivery of intelligence to units in the field.

The State of Intelligence in the United States before World War II

The United States began World War II at a disadvantage related to its information collection capacity. Throughout the interwar period, American leaders expressed minimal interest in emphasizing intelligence in the US Army. During the 1920s, Congress authorized only four general officers for the General Staff, so the role of the G2 fell to a colonel, while all other section leads were brigadier generals.[9] Intelligence operations often took a back seat to other responsibilities assigned to intelligence officers. For instance, Chief of Staff General John J. Pershing assigned public relations as a principal function of the G2. This additional tasking required intelligence officers at corps and below to spend more time on public relations tasks than intelligence work.[10] Officers whom leaders perceived were unable to perform more demanding jobs often found themselves relegated to intelligence work. This stigma led to officers viewing intelligence assignments as detrimental to their careers.[11] Even with minimal assigned

[9] US Army Intelligence Center and School (USAICoE), *The Evolution of American Military Intelligence* (Fort Huachuca: US Army Intelligence Center and School, 1973), 33.

[10] John Finnegan and Romana Danysh, *Military Intelligence* (Washington, DC: US Army Center of Military History, 1998), 43.

[11] Ibid.

intelligence work, tasks that should have fallen to intelligence officers often did not. Until 1937, the role of supplying intelligence estimates and annexes for war plans fell under the War Plans Division, not the G2.[12]

Immediately before America's entrance into World War II, the US Army began making incremental strides towards building a capable intelligence enterprise. The Military Intelligence Division grew from 20 officers and 46 civilians in 1939 to 200 officers and 848 civilians in 1941.[13] In 1939, only four US Army intelligence publications existed. By 1942, this number grew to 24.[14] Despite these improvements, the United States still lacked a field intelligence effort. Following the attack on Pearl Harbor, signals intelligence remained strategic. G2 sections created under rigid tables of organization and equipment (TOEs) were unable to meet their requirements. The weakest officers at each echelon represented most intelligence officers in the division and below.[15] Due to these shortcomings, the United States looked towards Great Britain for IC support and organizational precedence.

British Intelligence Organizations in World War II

Any analysis of the American IC enterprise during World War II would be incomplete without understanding British intelligence. As the United States intelligence community struggled to establish its organic capabilities, the US military relied heavily on the intelligence community in Great Britain, who maintained the lead for the Allies in IC throughout most of the war in Europe. Britain's lead role was understandable, given not only the late entry into the war by the United States but America's late start into the intelligence field in general. As the Supreme Headquarters Allied Expeditionary Force (SHAEF) commander, General Eisenhower had the

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[12] USAICoE, *The Evolution of American Military Intelligence,* 34.

[13] Finnegan and Danysh, *Military Intelligence*, 52, 55.

[14] Oscar Koch and Robert Hayes, *G:2: Intelligence for Patton* (Philadelphia, PA: Whitmore Publishing Company, 1971), 133.

[15] USAICoE, *The Evolution of American Military Intelligence*, 39.

entire British intelligence establishment at his disposal, and it made a crucial contribution to his successes. Even as the US improved its intelligence efforts throughout the conflict, General Eisenhower continued to rely primarily on the British for information on enemy strength, location, and intentions.[16]

The Secret Intelligence Service (SIS), also known as MI6, supplied military forces a range of information that ran beyond military service, including political intelligence.[17] SIS managed requests from customers, with new procedures governing the degree of priority attached to requirements, which helped reduce the growing demand on SIS HQ for their services. SIS had a strained relationship with another significant British national intelligence agency, the Special Operations Executive (SOE). SOE special agents performed subversion and resistance operations in enemy-held territories. [18]

Created in 1919, the Government Code and Cypher School (GCCS), headquartered in Bletchley Park, England, acquired intelligence utilizing cryptanalysis.[19] The GCCS helped break the Enigma machine and continued to exploit it throughout the conflict, providing invaluable intelligence on enemy forces.[20] The importance and benefit of intelligence acquired through the GCCS was evident as the GCCS grew from 900 personnel in 1941 to 7,000 by the end of the war.[21] The SIS maintained control over the SIGINT products the GCCS produced.[22] Throughout

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[16] Stephen E. Ambrose, "Eisenhower and the Intelligence Community in World War II," *Journal of Contemporary History* 16, no 1 (Jan 1981): 154-155, https://www.jstor.com/stable/260621.

[17] F.H. Hinsley, *British Intelligence in the Second World War: Its Influence on Strategy and Operations, vol.I* (London: Her Majesty's Stationary Office, 1986), 17.

[18] Ibid., 237.

[19] Hinsley, *British Intelligence in the Second World War: Abridged Version* (Cambridge: Cambridge University Press, 1993), 5.

[20] Ibid., 13-14.

[21] Ibid., 117.

[22] Nigel West, *Historical Dictionary of World War II Intelligence* (Lanham, MD: Scarecrow Press, Inc, 2008), 220.

the war, the British were a major contributor to American SIGINT operations. At the beginning of the war, the United States was incapable of conducting effective SIGINT operations independently. It relied on tying in the British SIGINT enterprise to provide intelligence and support American operations.

Like the United States, Great Britain neglected air reconnaissance following World War I, not investing in air reconnaissance until later in the mid-1930s. By then, no adequate procedures existed to acquire intelligence from air reconnaissance.[23] Britain created the Air Intelligence Branch (AI) in 1935 to grant a substantial measure of autonomy to the Air Ministry and War Offices intelligence branches.[24] As ground forces' understanding of air reconnaissance's intelligence capabilities grew, the demand for air reconnaissance intensified. Britain created a central photographic intelligence (PI) organization, which later became the 1 Photo Reconnaissance Unit (PRU). Britain later established the 3PRU, and by mid-1941, all assets of the 1PRU and 3PRU merged under one consolidated organization. The Photographic Intelligence Unit (PIU) exploited all photography collected by PRUs.[25]

The agencies summarized in this section provide the most significant ties to the evolution of American SIGINT and air reconnaissance information collection in Europe during World War II. The Americans learned many lessons from the British, including organization structure, while also illustrating many interworking relationships between both nation's organizations, especially in the role of Allied intelligence organizations. Future research could expand on the relationships and lessons learned from the other numerous British intelligence disciplines.

United States Intelligence Gathering Organizations

In cooperation with British intelligence agencies, the United States established and built

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[23] Hinsley, *British Intelligence in the Second World War, vol.1*, 26.

[24] Ibid., 11.

[25] Roy Stanley II, *World War II Photo Intelligence* (New York: Charles Scribner's Sons, 1981), 57.

its military intelligence enterprise to support wartime operations. Although the United States sought a more prominent role and with some intelligence gathering autonomy, the United States' intelligence enterprise functions continued to rely heavily on British support until the end of the war in Europe.

The American Military Intelligence Services (MIS) was an overall grouping of intelligence agencies that had purely operational functions, distinct from staff functions. The MIS's purpose was to relieve the G-2, ETO, from exercising administrative control over a multitude of units and individuals while giving field agencies a degree of autonomy.[26] The MIS organization united all intelligence-gathering agencies under the Military Intelligence Division (MID), except for counterintelligence.[27]

Created in 1942 by General William "Wild Bill" Donovan in 1942, the OSS conducted independent intelligence and special operations under the direct control of the Joint Chiefs of Staff until 1944.[28] The precursor to the Central Intelligence Agency (CIA), the OSS handled special operations, special intelligence, counterintelligence (X2 or CIB), psychological warfare, and field photography.[29] Despite the strategic nature of OSS, US Army personnel provided the bulk of OSS strength.[30] OSS offered invaluable support to tactical and operational support to forces in the field. Major General (R) Oscar Koch, General Patton's G-2, noted that:

> (w)hen beach studies were vitally needed during intelligence planning for the invasion of southern France, they were obtained by the OSS…(a) request was placed with OSS… (and it took about) ten days to two weeks. Within that period, a complete outline of defenses, drawn to scale on a map with draftsmen precision and ready for reproduction,

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[262626] The General Board, Headquarters, United States Forces, European Theater, *Organization and Operation of the Military Intelligence Service in the European Theater of Operations* (Washington, DC: US Army Center of Military History, 1945), 1.

[27] Ibid., 1, 4.

[28] In 1944, OSS and SIS were both assigned under a newly created Allied HQ, Special Troops, Supreme Headquarters, Allied Expeditionary Force. Finnegan and Danysh, *Military Intelligence*, 92; West, *Historical Dictionary of World War II Intelligence*, 169.

[29] US Forces, *Organization and Operation of the TIS in the ETO*, 8.

[30] Finnegan and Danysh, *Military Intelligence*, 92.

was given to me personally.[31]

The close relationship between the OSS and the US Army contrasts with the current relationship between the CIA and the Department of Defense (DoD). This contrast is evident not only in the clear delineation of military personnel and CIA agents but also more recently with the DoD's decision announcing their intention to withdraw most support for CIA counter-terrorism operations by the end of 2020.[32] The support the DoD provided the CIA included air transportation, logistics, and medical evacuation. The DoD announcement also included removing DoD personnel attached to the CIA and returning some military equipment.[33]

OSS cooperation with British intelligence agencies illustrates both the benefits and challenges of multi-national information collection operations. OSS attached personnel to the British MI5 (deception operations, SOE, and SIS) to coordinate operations. In 1943, Britain and the United States created a joint war room to coordinate counterintelligence operations between OSS, MI5, and MI6.[34] Despite this increase in collaboration, there were challenges to multi-national cooperation between allies. The British SIS and OSS clashed over intelligence gathering deconflictions in Europe. OSS did not want to coordinate or merge its intelligence-gathering operations in the field with SIS. SIS insisted that the OSS not conduct any operations in the UK or Europe without full consultation with SIS.[35] Compounding this strained relationship with SIS was OSS's closer working relationship with another organization that SIS clashed with; the

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[31] Some punctuation added by author to aid in readability. Koch and Hayes, *G:2: Intelligence for Patton*, 141.

[32] Jim Sciutto, Ryan Browne, and Zachary Cohen, "Pentagon planning to withdraw support for most CIA counter-terror missions," CNN.com, last modified December 10, 2020, accessed 24 March 2021. https://www.cnn.com/2020/12/10/politics/pentagon-cia-counterterrorism/index.html.

[33] Ibid.

[34] US Forces, *Organization and Operation of the TIS in the ETO*, 8.

[35] F.H. Hinsley, *British Intelligence in the Second World War: Its Influence on Strategy and Operations, vol.III, part 1* (London: Her Majesty's Stationary Office, 1986), 464.

British SOE.[36]

The US Theater Intelligence Services (TIS) fell under the oversight of the G-2 Division, SHAEF. Under the G-2 Division, intelligence disciplines fell under various subsections to provide organizational oversight. The initial TIS organizational structure evolved to streamline subsection control measures and absorb increases in theater intelligence capabilities. By 1945, the G-2 Division, SHAEF, included seven sub-divisions, managing areas such as counterintelligence, SIGINT, and operational intelligence.[37] The evolution of the TIS reflected the adaptability and growth of the Allies' intelligence capabilities.

At the tactical level, the smallest unit with organic intelligence personnel was at the battalion level.[38] Combat intelligence, or intelligence produced in the field, was responsible for military intelligence sections at all tactical echelons.[39] According to Field Manual 30-5, *Combat Intelligence* (1940), unit intelligence sections were responsible for producing and handling intelligence at a scale commensurate with their organization's size and scope of their mission. Unit intelligence sections needed to organize their personnel and equipment to integrate into command working conditions in all situations while maintaining an essential degree of mobility. In addition to these requirements, intelligence sections still had to "facilitate the collection, collation, evaluation, and interpretation of information as well as dissemination of intelligence to all concerned."[40] These collection management tasks were the primary function of intelligence

[36] Hinsley, *British Intelligence in the Second World War, vol.III, part 1,* 462.

[37] US Forces, *Organization and Operation of the TIS in the ETO*, 47-48.

[38] Although this the lowest level of assigned intelligence personnel in the US Army today, the Army did establish Company Intelligence Support Teams (CoIST), with intelligence personnel augmented from the Battalion S-2 section down to the line companies.

[39] United States War Department, Basic Field Manual (FM) 30-5, *Military Intelligence Combat Intelligence* (Washington, DC: US Government Printing Office, 1940), 3.

[40] Ibid., 6.

sections at division and below.[41] In LSCO, tactical-level intelligence sections must maximize the intelligence requirements commensurate with the size and scale of their unit's mission. Today, US Army intelligence sections' Analysis Control Elements (ACE) perform many collection management duties, intelligence analysis, and intelligence production. The ACE has numerous sections to manage collection management tasks, including Geospatial intelligence (GEOINT), HUMINT, and SIGINT analysis.[42]

Although doctrine assigned intelligence responsibilities commensurate with a unit's size and mission, field unit intelligence sections still struggled to maintain adequate intelligence support. To rectify this, the G-2 attached combat unit collecting agencies to support subordinate organizations' intelligence operations. The Military Intelligence Support Teams' (MIST) sole purpose was to support G-2 intelligence activities. Outside of liaison support, MISTs provided specific capabilities to support unit IC operations. Teams of intelligence scouts worked in conjunction with reconnaissance patrols or raiding parties to gather information. Another MIST examined enemy prisoners of war, deserters, and local inhabitants for information. A third team examined captured documents and material. Aerial photography interpretation teams assisted units in GEOINT activities. Finally, some teams studied hostile and neutral press for intelligence, similar to open-source intelligence (OSINT) today.[43] In large-scale warfare, personnel augmentation is an effective means to help subordinate organizations accomplish increasing mission requirements as the scale of conflict expands.

Expecting intelligence sections at each echelon to manage the scale of intelligence necessary to conduct an organization's mission is still an expectation of military leaders. In US

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[41] War Department, FM 30-5, 3.

[42] US Department of the Army, Army Techniques Publication 2-19.3, *Corps and Division Intelligence Techniques* (Washington, DC: Government Publishing Office, 2015), 2-5.

[43] Although these MISTs represent capabilities that could be assigned to combat units, many of these roles were not present in every combat unit. These capabilities indicate the types of agencies that could be available for supplementing tactical units. US War Department, FM 30-5, 13-14.

Army operations throughout the wars in Iraq and Afghanistan, this has not been an issue due to the myriad of outsourcing of much of the IC process, such as exploitation and dissemination happening at organizations out of the theater. Operations' size, scale, and tempo are not comparable to what organizations can expect in a LSCO conflict. With the entirety of the United States intelligence enterprise supporting a future large-scale conflict, it remains to be seen if the current force structure can support the increased flow of data for analysts to gather, analyze, and disseminate relevant intelligence to units in time for commanders to make informed decisions.

US Army Information Collection and Collection Management

In 1939, FM 100-5 *Operations* noted the importance of the information collection process for translating information to useful intelligence.

> Before information can be accepted, it must be studied, conflicting items weighed against each other, and the whole evaluated dispassionately…information of the enemy and of the terrain…must be evaluated to determine its probable accuracy and, together with other items of information, must be interpreted to determine its probable significance. *It then becomes military intelligence* [italics added for emphasis].[44]

The data collected from intelligence gathering assets alone does not constitute intelligence, which is important as collected data requires additional time-consuming personal analysis before any information becomes finished intelligence.

As is the case today, commanders were responsible for their unit's information collection activities in World War II. FM 100-5 tasked the commander to monitor "all IC agencies at his disposal" continuously while also ensuring constant communication with neighboring units to maximize dissemination of any pertinent, horizontally and vertically, regardless if units requested specific information.[45] Cross-sharing of intelligence ensured that information that lacked importance to one organization could gain significance when referenced with other available

[44] United States War Department, Tentative Field Service Regulations Field Manual (FM) 100-5, *Operations* (Washington, DC: US Government Printing Office, 1939), 38, 40.

[45] Ibid., 39.

intelligence.[46] Although commanders owned their unit's information collection activities, managing the program fell on the unit intelligence officer, as it still does today.[47] In the 1940 publication of FM 30-5, the G-2 section's responsibility was to manage the entire information collection process. Managing the IC process included: specifying what information needed gathering, processing and analyzing data collected from all available resources, and ensuring the staff integrated intelligence in all mission plans and orders.[48]

Once IC activities produce intelligence, the final products must reach the attention of those individuals or units who require them. The unit G-2s were responsible for disseminating intelligence in time to be of value for units issuing orders.[49] There were three primary means of disseminating intelligence. The most preferred method was direct communication between units from the G-2s or their assistants, either in person or over a telephone. A less preferred method was a special message, delivered either by airplane, a motorcycle messenger, or other rapid means of communication. For information that did not require rapid dissemination, the G-2 could disseminate information through routine staff meetings, planning sessions, or commander update briefings.[50] In future large-scale conflicts, when the enemy degrades the US Army's ability to communicate, it is essential to plan for multiple methods of sharing intelligence.

The requirements for IC and CM were as crucial in World War II as they remain today. Although World War II posed some technological challenges due to the limitations of the era, the basic need to request, receive, analyze, and relay intelligence to those who needed it still existed

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[46] United States War Department, Tentative Field Service Regulations FM 100-5, *Operations* (Washington, DC: US Government Printing Office, 1941), 46.

[47] The numerical designation for unit intelligence officers is 2. Depending on the type of organization, the letter preceding the 2 changes, such as J-2 for a joint unit, G-2 for Army echelons above Division, and S-2 for brigade and battalion. This paper will use G-2 when referring to all unit intelligence officers.

[48] US War Department, FM 30-5, 4-5.

[49] Ibid., 5.

[50] Ibid., 27-28.

just as it does today. Doctrine outlines the US Army's expectations for conducting information collection operations in conflict. Still, as is usually the case, a conflict's specific operational environment plays a more significant part in dictating what operations intelligence sections conduct.

HUMINT played a significant role in World War II. It included enemy prisoner of war interrogations and special reconnaissance. 12th US Army Group ranked prisoner of war interrogation with tactical and photo-reconnaissance as the best sources of information.[51] In the US Army, MIS-Y was responsible for the high-level interrogation of important enemy prisoners of war.[52] Prisoner of war interrogation teams were often assigned to US Army field units, down to the division level, to provide additional organic capabilities to conduct rapid interrogations.[53]

Similarly, secret intelligence and special reconnaissance provided significant intelligence support for the allies as well. For instance, OSS parachuted agents behind German lines to secure enemy information and recruit other potential agents. These agents collected information on the German army from residents in Valognes, Montebourg, and Cherbourg.[54] OSS agents also worked with numerous French underground resistance sources to send back intelligence reports to US Army units in Europe.[55] The Allies also utilized special commando units to operate in enemy territory. The No. 3 (Jewish) Troop, X Commandos, were primarily German-speaking Jewish refugees who conducted numerous specialized tasks, including silent reconnaissance and enemy interrogations, often behind enemy lines. Their knowledge of German units and training provided

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[51] Jared B. Schopper, "The Collection and Processing of Combat Intelligence as Performed by the US Army During Operations in Northern Europe" (MMAS Thesis, US Army Command and General Staff College, Ft. Leavenworth, KS, 1964), 61.

[52] USAICoE, *The Evolution of American Military*, 47.

[53] US Forces, *Organization and Operation of the MIS in the ETO*, 4, 27.

[54] Schopper, "The Collection and Processing of Combat," 74.

[55] Ibid., 77.

the Allies valuable intelligence expertise on enemy capabilities.[56]

Unfortunately, due to the limitations of space, this monograph will not consider HUMINT in depth. Instead, this monograph focuses on two aspects of intelligence and warfare that experienced rapid evolutions in World War II: aerial reconnaissance and SIGINT. Given its importance, examining HUMINT as a case study in World War II is an area that future research can explore to provide lessons learned and recommendations for future large-scale operations.

Allied aerial reconnaissance and SIGINT are the two intelligence gathering disciplines this monograph explores. These two disciplines provide great representations of the United States' quick adaptation to emerging technological changes and the rapid innovations and changes of procedures as the US Army gained combat experience. Both intelligence disciplines received little emphasis in American intelligence before World War II. They therefore required constant evolutions to reach operational effectiveness and to support the needs of field units.

Aerial Reconnaissance

Following World War I, the US Army drastically reduced aerial reconnaissance units' sizes and cut off funding for equipment.[57] By 1936, the US army authorized each corps four observation squadrons. However, the assignment of these assets remained notional due to the limitations of resources to fill either active or guard requirements. The 1941 technical manual on aerial photography, TM 1-20, consisted of 65 *Readers Digest*-sized pages outlining the use of maps, imagery, and tables to aid mission planning. By 1942, the updated manual had expanded to 261 pages but issued no new guidance on the use of aerial photography in support of combat operations. Although the manual briefly discussed photographic processing, the manual did not

[56] Martin Sugarmen, "World War II: No. 3 (Jewish) Troop of the No. 10 Commando," Jewish Virtual Library, accessed 24 March 2021. https://www.jewishvirtuallibrary.org/no-3-jewish-troop-of-the-no-10-commando.

[57] USAICoE, *The Evolution of American Military Intelligence*, 38.

mention photographic interpretation.[58]

Initially, observation squadrons and balloon squadrons, with which the G-2 was most concerned, did not have separate intelligence sections. Personnel in the operations sections of each squadron performed the necessary intelligence duties.[59] Despite the lack of assigned intelligence personnel, Army Air Corps intelligence sections were responsible for collecting data from all available assets, exploiting the data, and disseminating the completed intelligence to air corps intelligence and flight crews.[60]

Each observation squadron had four cameras, although squadrons likely used no more than two cameras at any given time, which reduced the amount of images missions could produce.[61] Producing imagery of an area roughly 25 miles required at least one hour using one airplane. Photographic interpreters at the air corps airfield needed an additional four hours to make a mosaic.[62] When allowing for flight time to and from the airfield, it would take roughly 5.5 hours to get finished mosaics into the hands of the G-2.[63] Despite modern technology advances significantly reducing the time requirements to deliver photographic intelligence to units, the military must account for the time required to process intelligence. In LSCO, the availability and capability of assets will also reduce the availability of customized aerial intelligence products as the competition for the allocation of limited assets increases.

As the United States began preparations for entrance into World War II, the United States Army Air Forces (USAAF) A-2 understood that America had little information on Germany and

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[58] Stanley, *World War II Photo Intelligence*, 247.

[59] Edwin Schwein, *Combat Intelligence: Its Acquisition and Transmission* (Washington, DC: The Infantry Journal, 1936), 32-33

[60] Ibid., 33.

[61] Ibid.

[62] To compile a mosaic, a series of smaller aerial photos put together with adjacent photos create a larger picture of a coverage area. Ibid.

[63] Ibid.

no reliable means to obtain intelligence. In 1941, the Assistant Chief of Air Staff, Intelligence (ACAS A-2), General Henry "Hap" Arnold, sent observers to Great Britain to gather intelligence the British were willing to share, as well as learn anything they could about British imagery intelligence (IMINT) operations.[64] Based on what he learned, one of the observers, Major Charles Cabell, recommended an entirely separate USAAF organization to oversee American IMINT functions. He also recommended a technical training school to train photo interpreters and IMINT intelligence officers. Feedback from other observers led the USAAF to create the Air Intelligence School at College Park, Maryland, and pursue organic high-altitude, high-speed reconnaissance aircraft for the USAAF.[65] Today, the US performs a mentorship role similar to that of the British in 1941. In future LSCO fights, that mentorship role becomes more challenging as the rapid nature of conflict against a peer adversary reduces preparation space.

After the United States entered the war in Europe, American military personnel established cooperative relationships with their British counterparts. In 1942, Brigadier General Ira Eaker arrived in Britain to establish American air intelligence operations. Early American impressions of the British were highly positive, noting how the British more than lived up to intelligence-sharing agreements and were extremely accommodating to their new allies, sharing intelligence procedures and information.[66] Mutual understanding of America's weakness in the early stages of the war led to an agreement that the British Air Ministry would supply US Air Forces in Europe with operational and air target intelligence. The United States provided liaisons throughout various sections of the British Air Ministry.[67]

The USAAF continued to adapt and evolve after entering World War II. In April 1942, the USAAF realized their current reconnaissance structure required reorganizing. They dissolved

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[64] Tyler Morton, "From Kites through Cold War: The Evolution of United States Air Force Manned Airborne ISR" (PhD diss., Air University, Maxwell AFB, AL, 2016), 233.

[65] Ibid., 235.

[66] Ibid., 237.

[67] US Forces, *Organization and Operation of the TIS in the ETO*, 4.

reconnaissance and bombardment squadrons and created independent "tac recce" groups. The USAAF also began replacing their outdated aircraft with newer models. By 1943, there was a noticeable improvement in photo-reconnaissance squadrons' effectiveness, as increased training and capabilities enabled pilots to maximize their faster airplanes and better cameras to conduct operations.[68]

Despite its early struggles, American participation in aerial reconnaissance increased tremendously by the end of the war. The American capability growth contributed to the British Air Ministry's intelligence sections and the US Strategic Air Forces essentially integrating and working as a cohesive unit and producing all strategic aerial intelligence in Europe.[69] The US Army would come to rely heavily on aerial reconnaissance for intelligence, proving to be second only to the interrogation of enemy prisoners of war (EPWs) in its usefulness during Operation OVERLORD planning.[70]

The primary role of the A-2 Division, US Strategic Air Force, was to supply the SHAEF Headquarters with the following types of intelligence (primarily through photographic reconnaissance): terrain, flak installations, condition of enemy communication systems, intelligence concerning new types of enemy aircraft, and special strategic studies.[71] The responsibility of providing air reconnaissance at the tactical level fell upon Tactical Air Commands (TAC). Commanded by numbered Air Force units, TAC provided units in the field with tactical reconnaissance and photographic reconnaissance support.[72] Air reconnaissance was responsible for four primary missions: visual reconnaissance, photographic reconnaissance,

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[68] USAICoE, *The Evolution of American Military Intelligence*, 60.

[69] Ibid.

[70] Schopper, "The Collection and Processing of Combat Intelligence," 117.

[71] US Forces, *Organization and Operation of the TIS in the ETO*, 5.

[72] Phil Jackson, "10th Photographic Reconnaissance Group," American Air Museum in Britain, last modified 22 February 2017, accessed 24 March 2021. http://www.americanairmuseum.com/unit/207.

artillery adjustment, and liaison personnel.[73] The five types of photographic reconnaissance missions provided were: area coverage, point objectives, coverage of enemy activities, battle damage assessments, and photo support for land operations.[74]

At the theater level, requests for photographic intelligence originated from a myriad of customers, such as each service branch or from SHAEF directly. The customers directed their requests to the Joint Photographic Reconnaissance Committee (JPRC), a Joint Intelligence Committee (JIC) subcommittee. Like the JIC, the JPRC employed British and American personnel, with two British Army, Navy, Royal Air Force (RAF), and American officers working under an American colonel's leadership. The staff of the JPRC consolidated requests, checked if requested targets or areas were already covered from previous missions, and assessed the possible risks attached to each requested mission. From the JPRC, requests traveled to the Technical Control Office (TCO). A British Wing commander headed the TCO, consisting of personnel from the Royal Navy, the British Army, the USAAF, and a senior photographic officer. The role of the TCO was to allocate mission priorities.[75]

FM 30-21, *Role of Aerial Photography*, noted that requests for aerial photographs should travel through normal channels, units could transmit requests written or orally and must have included specific request guidelines for the air reconnaissance units, such as the area or points units needed photographed, the hour of exposure, the purposes of the photographs, and the number of prints the requesting unit wanted.[76] It is vital for any personnel conducting

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[73] David D. Dengler, "Seeing the Enemy: Army Air Force Aerial Reconnaissance Support to US Army Operations in the Mediterranean in World War II" (MMAS Thesis, US Army Command and General Staff College, Ft. Leavenworth, KS, 2009), 13.

[74] John F. Kreis, *Piercing the Fog* (Washington, DC: Air Force History and Museums Program, 1995), 82.

[75] Ursula Powys-Lybbe, *The Eye of Intelligence* (London: William Kimber & Co. Limited, 1983), 36-39.

[76] United States War Department, Basic Field Manual (FM) 30-21, *Military Intelligence Role of Aerial Photography* (Washington, DC: US Government Printing Office, 1940), 8-9.

reconnaissance missions to have thorough information and data on the information units are requesting and where to disseminate the requested intelligence products. Today, collection managers are responsible for providing specific and detailed requests for support. FM 3-55, *Information Collection,* defines the minimum detail requirements as what to collect, where to collect it, when and how long to collect, and why to collect.[77] The specific information required to answer those four questions varies depending on the specific collection asset or theater policies.

Support for units in the field followed more makeshift procedures, as the reality of the situation in the field necessitated flexibility, speed, and accessibility. FM 1-20, *Tactics and Techniques of Air Reconnaissance and Observation,* noted that the reconnaissance units should remain as physically close to supported units as possible while maintaining the capability to relocate quickly.[78] Having aerial reconnaissance organizations located relatively nearby supported units increasing coordination of requests, liaison support, and dissemination speed of collected information. It also allowed for quicker mission coordination and deconfliction while also minimizing the flight time required for aircraft to reach their requested service areas.

It became standard procedure for field units to send representatives to air commands to coordinate support between ground and air units. Before Operation Neptune in 1944, First Army sent a G2 liaison to IX Tactical Air Command to coordinate plans and requests. This G2 coordination led to the creation of a G2 Air section at the airfield.[79] As the war progressed, liaison support represented one of many signs of organizations' adaptability to adjust air reconnaissance support procedures.

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[77] US Department of the Army, Field Manual (FM) 3-55, *Information Collection* (Washington, DC: Government Publishing Office, 2012), 4-1.

[78] Dengler, "Seeing the Enemy," 13.

[79] Due to security concerns during D-Day planning, all reconnaissance requests before D-Day had to first go to the 21st British Army Group to the Interservice Reconnaissance Committee for action. Schopper, "The Collection and Processing of Combat Intelligence," 32-33.

Coordination between Third Army and XIX Tactical Air Command (TAC) demonstrated another successful adaptation of aerial reconnaissance support. XIX TAC was assigned to support Third Army after their early struggles receiving aerial reconnaissance support. Similar to the First Army and IX TAC relationship, Third Army sent a liaison, called an air reconnaissance coordinating officer (ARCO) to XIX TAC to work directly with the XIX TAC reconnaissance officer. Together, the ARCO and the XIX TAC reconnaissance officer consolidated coverage support requests from the army, corps, and divisions daily at 1800. They determined the prioritization of requests while also preventing overlap of requests or duplication of work.[80] In any future LSCO, the US intelligence enterprise will benefit from maximizing direct communication between intelligence-gathering agencies and requesting organizations. It increases clarity and reduces misunderstandings in requests for support. Having direct liaison support between G2 sections and intelligence-gathering organizations helps mitigate the impacts of degraded or denied communications by having a unit representative nearby for personal coordination. Having units located in proximity to each other eases the strain of exchanging liaisons.

Sending liaisons to TACs did not always result in effective communication and coordination. As field army tactical or photographic requests required processing through the air force headquarters, field armies required their own direct liaison to their supporting tactical air command for responsive service. This abundance of different liaisons with competing interests led to the process of support becoming ineffective and time-consuming.[81] Field armies planned aerial reconnaissance missions in even greater detail than ground operations in Northern Europe. Because of this increase in detail and planning for air support, there was a decrease in availability

[80] Schopper, "The Collection and Processing of Combat Intelligence," 36.

[81] Ibid., 55.

and increased complexity for units to receive air support.[82] Although divisions could preplan and request specific collection missions, the challenge of support experienced by field armies and their supported tactical air commands impacted the level of support available to support division requests directly.[83]

Upon receipt of aerial photographs, FM 30-21, *Military Intelligence Role of Aerial Photography*, tasked the G-2 of the photographic reconnaissance organization with distributing photos to numerous other organizations and personnel, including the next higher unit, the unit air and artillery officer, and the remaining photos to the subordinate unit requesting the photographs (usually no more than 15 copies).[84] Despite the number of copies required for dissemination, field units typically preferred much more for distribution to subordinate units. The G-2 of the 104th Infantry Division considered 96 copies of the area at least 2,000 yards in front of the division optimal. He later reduced his preferences to 48 photos with more than fifty percent overlap.[85] The discrepancy between how many photos doctrine allocated to units and how many copies various G-2s requested illustrates how combat conditions will often dictate requirements doctrine does not forecast.

Despite collection management procedures and distribution guidelines, there were still difficulties getting aerial support and photos to units in the field. In October 1944, the 80th Infantry Division G-2 noted that they did not receive any aerial photographic coverage until October 1944.[86] Following the October 1944 after-action report, the 80th Infantry Division G2 noted receipt of photos in the following months until the end of the war. Due to bad weather, slow

[82] Ibid., 179.

[83] Ibid., 119-120.

[84] US War Department, FM 30-21, 11.

[85] Ibid., 106-107.

[86] US Department of the Army, *G-2 After Action Report: October 1944*, 80th Infantry Division (Washington, DC: US Government Printing Office, 1944), 2.

dissemination of photos, the unpredictable availability of support from XXIX TAC, and the German counteroffensive in the Ardennes, the Ninth Army did not experience any effective photographic reconnaissance results until the middle of February in 1945.[87] Despite lapses in coverage, operations for the 80th Infantry Division and Ninth Army continued. In future LSCO, military commanders and staffs will have to plan operations without all desired aerial intelligence given enemy A2/AD capabilities, changing weather conditions, and the limited availability of collection assets to support a large-scale force.

Despite intelligence shortcomings, air and ground personnel displayed ingenuity and adaptability to maximize the support provided from aerial reconnaissance products. During Operation COBRA, coordination for direct communication between the tac recce squadron and ground forces resulted in the reduction delays in the transmission of information and providing real-time air support. Some air personnel even rode in forward tanks, maintaining communication between air and ground forces via VHF radios.[88] In 1945, tac recce squadrons equipped their planes with cameras, which allowed pilots to conduct photographic reconnaissance while flying training missions to provide additional support to Ninth Army.[89] Other methods squadrons used to increase support to ground command posts and overcome faulty communications included inflight reports from pilots to the G-2 Air, daily dispatches of reconnaissance reports to ground unit headquarters, and detailed preplanned requests to ensure maximum understanding of collection requirements.[90]

Intelligence gathering in World War II began to outpace unit's organic capabilities to analyze all the data they received correctly. To assist with shortcomings, the Military Intelligence

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[87] Schopper, "The Collection and Processing of Combat Intelligence," 103.

[88] Schopper, "The Collection and Processing of Combat Intelligence," 87.

[89] Ibid., 103.

[90] Ibid., 116.

Services of the ETO assigned photographic interpretation teams to support units in the field. For example, the Third Army received 32 photographic interpretation teams from the MIS, including four per corps and one per division. Later, Third Army detached teams from their subordinate corps to strengthen their own photographic interpretation center.[91] Photographic interpreter teams produced mosaics, collated maps, gridded obliques, and provided detailed photographic interpretation. Corps and divisions usually allocated at least one or two teams for operational and short-range requirements.[92]

Aerial reconnaissance in World War II provides a pertinent example of how the military had to adapt to a fast-growing and infantile warfighting domain, incorporating evolving technology, challenges, and theory. The USAAF observations of RAF operations and using British lessons learned allowed the United States to quickly make up ground in their air operations proficiency, which shows the utility of partnered nation assistance to build capabilities. Field units had to overcome challenges with requesting information and interpreting aerial photography, which they overcame through liaison support and personnel allocation. This monograph did not cover the impacts on aerial reconnaissance posed by an enemy with advanced air defenses. Advanced anti-access and area denial (A2/AD) capabilities will significantly impact the future of aerial reconnaissance in future LSCO, likely decreasing the availability of manned reconnaissance aircraft. Despite not discussing the impacts of A2/AD, the lessons learned from aerial reconnaissance operations in World War II provide valuable insights to information collection operations across all warfighting domains.

Signals Intelligence

After the end of World War I the United States began establishing strategic SIGINT capabilities. World War I veteran Herman Yardley traveled to Europe to observe the other Allied

[91] Ibid., 43.

[92] Schopper, "The Collection and Processing of Combat Intelligence," 57.

nations' cryptologic efforts. Upon returning from Europe, Yardley convinced the State Department to create a strategic cryptological operation known as the "American Black Chamber."[93] Yardley's cryptanalytical activities continued unabated until 1929, when new Secretary of State, Henry Stimson, closed the "American Black Chamber," citing his viewpoint that "gentlemen do not read each other's mail."[94] The closing of the "American Black Chamber" and the State Department's views on strategic cryptanalytical activities hindered America's strategic SIGINT capabilities leading up to the outbreak of World War II.

Despite the State Department's aversion to Yardley's strategic cryptological efforts, the US Army continued advancing its SIGINT activities during the interwar period. In 1921, the US Army Signal Corps, which owned US Army cryptanalytical activities, assigned William Friedman, a Russian-born engineer, as its chief cryptographer. Friedman's organization developed code and cipher capabilities for the US Army and planned wartime SIGINT activities. By 1929, the Signal Corps' War Plans and Training Division created the Signal Intelligence Service (SIS).[95] Through the SIS, the US Army effectively merged all Army cryptologic functions under the Signal Corps by 1930.[96]

By 1943, the US Army renamed the SIS to the Signal Security Agency (SSA).[97] The SSA consisted of two primary missions: protecting friendly communications against intercept and examination by enemy forces while also taking steps to capture and analyze as much information

[93] USAICoE, *The Evolution of American Military Intelligence*, 36.

[94] USAICoE, *The Evolution of American Military Intelligence*, 37.

[95] Ibid., 37

[96] John P. Finnegan, "US Army Signals Intelligence in World War II: An Overview" in *US Army Signals Intelligence in World War II: A Documentary History,* ed. by James L. Gilbert and John P. Finnegan (Washington, DC: Center of Military History, 1993), 3.

[97] As the naming convention changed but the role remained the same, this paper will continue with this acronym for the remainder of this section, even when referencing the period of time when the Army referred to this organization as the Signals Intelligence Service, and to avoid acronym confusion with the British Secret Intelligence Service.

from enemy communications as possible.[98] The SSA was responsible for conducting six types of collection missions, which included the interception of large amounts of enemy communication traffic, traffic analysis of intercepted messages, solutions of cryptographic systems utilized by the enemy, decrypting messages sent in solved or partially solved communication systems, and translation of collected enemy communications.[99]

Although the US Army assigned the SSA to the Signal Corps, the G-2 exercised staff supervision and control of the SSA throughout World War II. The G-2 had felt the SSA was the most critical source of intelligence, which required close control by the G-2. On December 10, 1944, the US Army transferred operational control (OPCON) of the SSA from the Signal Corps to the G-2. Shortly after World War II, the G-2 gained complete administrative control of the SSA.[100] Before the attack on Pearl Harbor, the SSA totaled only 331 personnel. By the end of World War II, the SSA had over 10,300 personnel, which did not include the over 17,000 officers and enlisted personnel engaged in SIGINT activities under the control of theater commanders overseas, nor do those figures adequately capture personnel turnover.[101]

Located at a former women's junior college, the Arlington Hall Station in Virginia was home to the US Army principal cryptanalytic center during World War II. The main schoolhouse building housed the headquarters of the SSA.[102] As the war progressed, Arlington Hall's significance increased as special machinery allowed the SSA to receive selected messages from cryptanalysts in England for exploitation. The SSA could answer requests from Bletchley Park

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[98] SRH 349, "The Achievements of the Signal Security Agency in World War II," in *US Army Signals Intelligence in World War II: A Documentary History*, ed. by James L. Gilbert and John P. Finnegan (Washington, DC: Center of Military History, 1993), 89.

[99] SRH 349, "The Achievements of the Signal Security Agency in World War II," 94.

[100] Ibid., 92.

[101] Ibid., 89.

[102] James L. Gilbert and John P. Finnegan, ed., *US Army Signals Intelligence in World War II: A Documentary History* (Washington, DC: Center of Military History, 1993), 87.

and deliver their results back to England within 60 to 90 minutes.[103] As they gained experience, the SSA innovated by creating special machines, developed new procedures and updated their techniques to keep pace with Germany's complex cipher machines.[104] The SSA's ability to conduct exploitation out of the ETO and return intelligence promptly reflected an early example of the military outsourcing intelligence operations to personnel out of theater, a process still employed regularly in contemporary conflicts.

In 1942, the United States and Great Britain entered into an agreement to exchange intercepted material, cooperate in the development of Radio Finger Printing (RFP) and TINA cryptanalysis techniques, and establish an Allied Y committee to oversee Allied cryptanalysis operations.[105] Cooperation between the US and Britain had some challenges. For instance, US cryptanalysts wanted the ability to independently exploit the Enigma machine if they wished, while the GCCS feared duplicating work with the US in Europe. Both nations compromised, which allowed one US Army and two US Navy cryptanalysts to work at the GCCS Headquarters at Bletchley Park.[106]

In 1943, the British Y board proposed that SIGINT and Y authorities have representation with the Chief of Staff to the Supreme Allied Commander's (COSSAC) planning staff. Security concerns led to the rejection of this plan. The COSSAC headquarters would not receive SIGINT in its unfiltered state until the end of 1943, when COSSAC gained authorization to create a Special Intelligence Board. This board became responsible for coordinating Operation Overlord planning between the British and American Y units and holding conferences with key SIGINT and Y authorities. The British and American SIGINT coordination for Operation Overlord

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[103] SRH 349, "The Achievements of the Signal Security Agency in World War II," 109.

[104] USAICoE, *Evolution of American Military Intelligence*, 109.

[105] F.H. Hinsley, *British Intelligence in the Second World War: Its Influence on Strategy and Operations, vol.II, part 1* (London: Her Majesty's Stationary Office, 1986), 56.

[106] Ibid.

planning led to a close relationship between the GCCS and the Overload headquarters, specifically the American 21st Army.[107]

The dissemination of SIGINT remained tightly controlled due to security concerns, considering the detrimental impact to future intelligence if the German's discovered the Allied capability related to the success of ULTRA. The MIS Special Branch selected and trained Special Security Officers (SSOs), who operated under the MIS's direct command, to disseminate ULTRA intelligence. These SSOs were the only authorized personnel to distribute ULTRA/SIGINT to field units, using special cipher systems to protect the products.[108] Early during the war, only the highest levels of Army commands had SSOs attached. A decision in 1944 allowed SSOs to disseminate ULTRA/SIGINT to lower echeloned forces in the field, including field armies and USAAF equivalents, and even down to independently Army corps.[109] In contemporary and future conflicts, when America operates within a multi-national coalition, the biggest challenge for disseminating intelligence is sharing intelligence with international partners who do not have access to American classified networks, such as the Joint Worldwide Intelligence Communications System (JWICS).[110] In future large-scale conflicts, US military units in the field can also expect to see reduced access to classified networks due to the constant relocation of unit command posts to avoid enemy fires.

Theater commanders directed their SIGINT activities through theater-level SIGINT services, which controlled various signal service companies assigned to field armies.[111] At the beginning of American involvement in World War II, signal service companies were an organic

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[107] Hinsley, *British Intelligence in the Second World War, vol.1,* 780.

[108] Gilbert and Finnegan, *US Army Signals Intelligence in World War II,* 135.

[109] Finnegan and Danysh, *Military Intelligence*, 81.

[110] JWICS allows for the transmission of Top Secret- Sensitive, Compartmented Information (TS-SCI) intelligence.

[111] Gilbert and Finnegan, *US Army Signals Intelligence in World War II,* 179.

part of the army and general headquarters services under the chief signal officer's control.[112] Radio intelligence companies were one type of signal service company. According to the FM 11-20, *Signal Corps Field Manual: Organizations and Operations in the Corps,* radio intelligence companies established, operated, and maintained radio stations to obtain SIGINT of enemy radio transmissions, locate enemy radio stations, gather information concerning signal security by intercepting friendly radio transmissions, and obtain information as to unauthorized radio stations by intercepting radio transmissions and locating positions of unauthorized stations located in Allied controlled territory. Another role of radio intelligence companies included the prompt transmission of all SIGINT and information gathered to their assigned headquarters, higher commands, or any other concerned organizations. Finally, radio intelligence companies recommended actions or procedures for friendly forces to follow to enhance units' signal security or suppress unauthorized radio stations.[113]

Generally, a signal service company included one radio intelligence platoon, a traffic analysis platoon, two radio intercept teams, and one radio direction finder team.[114] The traffic analysis platoon in each radio intelligence company compiled daily reports from their collection operations. They sent these reports to higher and adjacent units. Each report contained an intelligence summary, decoded messages and translations, a technical summary of nets heard, and the unit's message counts and set allocations.[115]

Although signal service companies had similar organizational structures, companies

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[112] United States War Department, Field Manual (FM) 11-20, *Signal Corps Field Manual: Organizations and Operations in the Corps, Army, Theater of Operations, and GHQ* (Washington, DC: US Government Printing Office, 1940), 43.

[113] US War Department, FM 11-20, 45.

[114] Ibid., 32.

[115] Jeffery S. Harley, "Reading the Enemy's Mail: Origins and Development of US Army Tactical Radio Intelligence in World War II, European Theater of Operations" (MMAS Thesis, US Army Command and General Staff College, Ft. Leavenworth, KS, 1993), 53

adapted their organization and procedures to suit their specific mission and suit their higher headquarters' needs. For example, the 3250th Radio Intelligence Company observed how most of their intercepts came during daylight hours. In response, the 3250th adjusted their manning for each of their three shifts to add more personnel to cover day shifts while also allowing each operator to have at least one day off every seven or eight days.[116] This adaptability allowed units to tailor their SIGINT organizations to their specific missions.

The US Army continued to update doctrine as they gained experience conducting SIGINT operations in World War II. By 1945, the US Army simplified radio intelligence units' responsibilities to gathering intelligence by intercepting enemy communications and obtaining information on unauthorized radio stations. Despite reducing radio intelligence units' responsibilities down to two missions, SIGINT units still did not have the resources to sufficiently complete both mission requirements. This limitation placed importance on unit signal and intelligence officers to maximize their use of their SIGINT resources.[117] The US Army's updated doctrine also allocated radio intelligence support to the corps level. Previously, only field army and higher echeloned forces had organic radio intelligence support.[118] Future military planners must balance the missions they assign intelligence organizations with those organizations' capacity to accomplish their tasks, especially in LSCO environments with personnel manning shortfalls.

Field units displayed adaptability to maximize the effectiveness of sharing SIGINT between organizations, laterally and horizontally. For instance, the Third Army established teletype links between corps' service companies and the 118th Radio Intelligence Company to distribute low-grade encrypted traffic. These links allowed corps elements to focus on

[116] Ibid., 48-49.

[117] US War Department, FM 11-20, 28.

[118] Ibid., 31.

intercepting and direction-finding operations, while the 118th Radio Intelligence Company handled translating and deciphering traffic. In another example, the 3250th Radio Intelligence Company's traffic analysis section maintained constant communication with the V Corps G-2 and the 113th Radio Intelligence Company at First Army through phone links and daily visits. The traffic analysis section provided the V Corps G-2 with reports daily each morning while ensuring they immediately sent any information of immediate tactical value to the G-2. The V Corps G-2 provided the radio officer with every piece of captured enemy radio equipment and documents concerning radios, codes, ciphers, callsigns, or frequencies to reciprocate the support relationship.[119]

Allied SIGINT operations in the ETO displayed numerous characteristics relevant to information collection operations today. First, SIGINT remains a valuable collection discipline with many security challenges to protect sources and methods. Just as Great Britain and the United States developed strict security guidelines to disseminate ULTRA intelligence, SIGINT today is still protected and controlled, with many SIGINT capabilities and products requiring a Top-Secret clearance for access. Although the Allies had to overcome some contentious issues between organizations, the British and Americans displayed a tremendous ability to collaborate on SIGINT and operations. Units at the tactical level benefited from adaptability and flexibility, using doctrine as a baseline to tailor support to units' specific mission requirements.

Findings

American IC operations in World War II illustrate the importance of multi-national intelligence cooperation, the challenges of managing intelligence personnel shortages, and the benefits of having intelligence-gathering organizations accessible to units in the field. Each case study illustrated how important it was for Britain and America to collaborate on intelligence operations and the challenges of sharing sensitive intelligence. For both aerial reconnaissance and

[119] Harley, "Reading the Enemy's Mail," 54.

SIGINT, the United States relied on the British intelligence architecture to establish its own capabilities. SIGINT operations showed the benefits of multi-national cooperation, highlighted by the SSA headquarters support to GCCS exploitation requests. Despite some success, SIGINT operations also highlighted issues Britain and the US had sharing access to ENIGMA intelligence. Without the strong partnership between the Americans and British, the Allied intelligence enterprise could not have succeeded.

Even with America instituting a draft to support the military in World War II, there were still personnel shortfalls in the intelligence community, especially in field units. Many of the early American intelligence personnel issues in World War II stemmed from the dismal state of US intelligence before 1941. Augmentation of military intelligence support teams to units in the field provided one solution the US Army adopted to assist combat intelligence operations. The MISTs represented an effective short-term solution to help units adapt to growing intelligence requirements. The US Army's reduction of the responsibilities of radio intelligence units is another example of how the US Army coped with available workforce challenges.

World War II illustrated the benefits of field units' proximity to other intelligence organizations. The proximity of aerial reconnaissance units allowed for greater coordination of requests and reduced the speed of disseminating intelligence products. The location of tactical air commands to units in the field allowed units to share liaisons to maximize coordination between units. The proximity of intelligence organizations allowed for multiple means of sharing and disseminating information. The proximity of intelligence organizations also allowed for in-person delivery of intelligence products and the exchange of liaisons. Locating air reconnaissance organizations near units in the field allowed the US Army to mitigate communication challenges by providing multiple means of communication.

Recommendations

The nature of current US military operations considers any future LSCO conflict as a

multi-national effort. US operations in Iraq and Afghanistan provide modern examples of US-led multi-national coalitions interoperating in combat environments. While those two conflicts provide significant intelligence cooperation experience for America and its allies, LSCO provides significant challenges not replicable in a limited combat environment. In high tempo, large-scale combat operations against a peer adversary, allies will need access to intelligence quicker than in counterinsurgency operations. America needs to begin establishing the best practices for adapting to intelligence-sharing challenges for LSCO.

The United States military has set the foundations for improving intelligence cooperation between allies and partners and emphasizes these efforts. The US military needs to emphasize intelligence cooperation during multi-national exercises while protecting classified information and techniques during peacetime. Intelligence fusion needs to be a vital component of any multi-national exercise, not just an afterthought. Sharing information is one thing, but to minimize the reliance on US collection agencies during any potential LSCO, the US must work, as Britain did, to build partners' capabilities. The US military must prioritize multi-national intelligence training on a similar scale as they plan multi-national combined arms exercises. This increased intelligence training needs to include military exchanges of intelligence officers during multi-national exercises. Allowing nations to swap intelligence officers will build operational experience and familiarity among intelligence professionals across allied and partnered nations.

In a large-scale conflict against a peer adversary, the United States will need to reconsider its classification protections to reduce the time it takes to distribute critical intelligence to partners. The current classification structure attempts to mitigate some challenges, with some permanent classification systems (Five Eyes (FVEY), NATO Classification system), as well as adaptable releasable classification caveats (ex. TOP SECRET//REL TO USA, JPN, and IND).[120]

[120] The Five Eyes Intelligence Oversight and Review Council (FIORC) is an intelligence alliance between the United States, the United Kingdom, Australia, Canada, and New Zealand. Office of the Director of National Intelligence, "Five Eyes Intelligence Oversight and Review Council (FIORC)," The

During a large-scale conflict, the United States must balance protecting classified material with the importance of delivering intelligence to partnered forces quickly enough to maintain the high tempo required for success in LSCO.

America and its partners must work to allow increased direct access to information collection assets in real-time. Many US military's aerial collection platforms provide direct links to their data, from the RQ-7 unmanned aerial vehicle (UAV) at the US BCT-level to the Joint Surveillance and Target Attack Radar System (JSTARS) at the theater level. These direct feeds to ground stations allow CPs to receive aerial reconnaissance data in real-time and adjust coverage areas. These real-time feeds are typically protected on American classified networks or through communication security (COMSEC) safeguards. The United States possesses the preponderance of intelligence collection technologies and capabilities, which will increase the reliance on US intelligence analysts to gather data from collection assets and disseminate intelligence to allies. The United States can mitigate this workload by providing direct feed access to its assets in the event of a large-scale conflict while also reducing the time it takes for allies to receive vital intelligence.

Contrasting the World War II draft military, the modern all-volunteer force will pose significant personnel issues across all military spectrums in LSCO, including intelligence. In a large-scale conflict against a peer threat, America needs to utilize its intelligence enterprise's total capacity. This increase in intelligence gathering will lead to enormous growth in the flow of data and information that needs to be filtered, analyzed, and produced. The US military needs to consider ways to mitigate manning issues while providing commanders and planners a complete

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National Counterintelligence and Security Center, accessed 24 March 2021, https://www.dni.gov/index.php/ncsc-how-we-work/217-about/organization/icig-pages/2660-icig-fiorc; REL TO refers to information that the originator has determined can be released and to which foreign countries or other organizations. Stephen A. Cambone, "Security Classification Marking Instructions," (official memorandum, Washington, DC: Department of Defense, 2004), accessed 24 March 2021, https://fas.org/sgp/othergov/dod/dod092704.pdf.

intelligence picture of a large-scale conflict's operating environment.

America faces a looming national security issue, with most of its population ineligible to serve in the military. A 2017 Pentagon study found that only 29% of young Americans between the ages of 17 and 24 are eligible to serve in the military, or 10 million out of 34 million Americans in that age group.[121] The military will need to consider waiving many physical requirements to maintain the necessary personnel to fight a prolonged large-scale conflict. The US can accomplish this by reducing or eliminating physical requirements in lower mobility fields, such as intelligence analysts. Allowing personnel who would otherwise be ineligible to serve to perform low-impact duties would open the recruiting pool substantially. The military will still need to ensure that Soldiers serving in expeditionary units possess the physical capacity necessary to support CP survivability while allowing physically deficient Soldiers to fill more sedentary military functions.

The MISTs provide a great example of how the military can increase tactical units' intelligence functions' capability. In future LSCO, a theater commander could augment the main effort with an increased intelligence personnel support to fill a myriad of roles supporting PED. After the operation terminates, the theater would then recall the supplemented personnel, ensuring tactical CPs do not permanently increase personnel, minimize the footprint, and maintain the maximum survivability of CPs. Theater Military Intelligence Brigades (TMIB) support their geographically aligned unified command with multidiscipline intelligence operations.[122] Except for V Corps, each corps headquarters has an assigned Expeditionary Military Intelligence Brigade (EMIB) to assist with supplemental intelligence support. In the event of a large-scale conflict

[121] Thomas Spoehr and Bridget Handy. "The Looming National Security Crisis: Young Americans Unable to Serve in the Military." *The Heritage Foundation Backgrounder*, No. 3282 (Feb 2018): 1, accessed 24 March 2021, https://www.heritage.org/sites/default/files/2018-02/BG3282.pdf.

[122] Thomas Deveans, Irene Zehmisch, and John Hirsch. *Theater Military Intelligence Brigade (TMIB) Mission Area Assessment Support*, TRAC-M-TM-13-035 (Monterey, CA: TRADOC Analysis Center, 2013), 2, accessed 24 March 2021, https://apps.dtic.mil/sti/pdfs/ADA582312.pdf.

involving multiple or all of the US Army's corps, the EMIBs and TMIBs can form consolidated support elements that provide theater commanders a resource of intelligence personnel to supplement subordinate elements with temporary augmentation for intelligence support.

According to Defense Advanced Research Projects Agency (DARPA) Director Steve Walker, "DARPA has been investing for about 56 of our 61 years in AI," or artificial intelligence.[123] Artificial intelligence will play a significant role in supplementing intelligence analyst personnel shortfalls. In 2019, Palantir assumed Project Maven's development, an AI project designed to filter through vast amounts of footage and imagery to identify particular images of interest.[124] It is possible that in the future, AI could automatically translate collected SIGINT and automatically deliver relevant available intelligence to planners when given a set of mission parameters. Once a unit receives a mission to seize a particular objective, an AI could deliver all pertinent intelligence on the objective without an analyst searching through complicated and crowded intelligence directories. By allowing AI to perform complex analyses of massive amounts of collected data, the US military can mitigate intelligence personnel shortfalls while also freeing up personnel to perform other intelligence functions.

In future LSCO conflicts, the US Army needs to maximize intelligence-gathering organizations' proximity to supported units as much as possible. During the Global War on Terror, America has benefited from unfettered access to the entire communication spectrum to mitigate communication challenges between units and collection organizations. This access allowed United States Central Command (CENTCOM) to stage aerial reconnaissance aircraft and

[123] Jill Aitoro. "Forget Project Maven. Here are a couple other DoD projects Google is working on," C4ISRNET, 13 March 2019, accessed 24 March 2021, https://www.c4isrnet.com/it-networks/2019/03/13/forget-project-maven-here-are-a-couple-other-dod-projects-google-is-working-on/

[124] Daniel Cebul. "Google is helping the Pentagon learn how to analyse drone footage," DefenseNews, 7 March 2018, accessed 24 March 2021, https://www.defensenews.com/home/2018/03/07/google-is-helping-the-pentagon-learn-how-to-analyze-drone-footage/; Ryan Daws. "Palantir took over Project Maven defense contract after Google backed out." AI NEWS, 12 December 2019, accessed 24 March 2021, https://artificialintelligence-news.com/2019/12/12/palantir-project-maven-defense-contract-google-out/.

the Combined Air Operations Center (CAOC) at Al-Udeid Airbase in Qatar, supporting units deployed throughout the CENTCOM area of responsibility. Network access allows supported units to provide constant feedback to aerial reconnaissance organizations. Chat applications, such as MIRC (Multi-user Internet Relay Chat) and Transverse allow users to congregate in chat rooms and collaborate instantly. In a conflict against an enemy capable of denying America's freedom of movement across lines of communication, the military needs to provide multiple means for units and collection agencies to communicate. Having collection organizations located closer to supported units provides increased communication opportunities to mitigate degraded communication environments, allowing the military to utilize short-range communication assets, reducing the reliance on cyberspace or satellite communication.

The US military embraced cyber and space capabilities to outsource intelligence responsibilities to personnel outside theaters of operation. This outsourcing includes drones in Afghanistan flown by pilots in Nellis AFB, Nevada, or data collected in Iraq exploited by Soldiers at Fort Gordon, GA. Although outsourcing intelligence can solve some organic personnel issues for units in theater, the distance also creates a more fragile system of conducting intelligence operations. By relying on secure cyber and space communications, losing freedom of movement in either domain severely impacts the pace of information collection. The DoD needs to invest in more efficient ways to provide direct links from collection platforms to ground elements, including receiving stations in theater in the proximity of the assets collecting data. Finally, having more military intelligence Soldiers in theater provides more personnel to augment field units to support tactical intelligence operations.

Conclusion

Over the past 75 years, the United States has not faced an enemy in conventional warfare that could challenge American dominance across all five warfighting domains. Even in America's conventional conflicts, such as Operation Desert Shield and Operation Iraqi Freedom's initial

stages, no enemy has challenged America's intelligence enterprise as a near-peer adversary will, such as China or Russia. America's intelligence enterprise has enjoyed relative freedom of movement, processing large amounts of data, and allocating off-site personnel to assist tactical units with PED and intelligence analysis. These conditions will not persist in a future large-scale conflict against a peer adversary. Vast amounts of units will compete for limited collection assets, communication degradation will limit the ability of data to travel between exploiter and requestor, and unit intelligence personnel will struggle to keep up with increasing amounts of data to analyze. World War II provides military leaders a relevant example of how intelligence operations will look in future LSCO that the wars in Iraq or Afghanistan could not provide. The challenge for leaders is applying lessons learned from a conflict 75 years ago to future conflicts, given technological advancements that will continue to differentiate how warfare will evolve. World War II presents lessons for future leaders to consider for conducting intelligence operations in the future. Dismissing these warning signs due to warfare changes since 1945 will lead to avoidable mistakes and preparation oversights in future large-scale combat operations.

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