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April–June 2020
PB 34-20-2

Intelligence Analysis

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Purpose: The U.S. Army Intelligence Center of Excellence publishes the **Military Intelligence Professional Bulletin** (**MIPB**) quarterly under the provisions of **AR 25-30**. **MIPB** presents information designed to keep intelligence professionals informed of current and emerging developments within the field and provides an open forum in which ideas; concepts; tactics, techniques, and procedures; historical perspectives; problems and solutions, etc., can be exchanged and discussed for purposes of professional development.

By Order of the Secretary of the Army:

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From the Editor

The following themes and deadlines are established:

October–December 2020, *Peer and Emerging Threats.* This issue will focus on developing an understanding of current and potential threats facing U.S. forces. Deadline for article submission is 1 July 2020.

January–March 2021, *Our Intelligence Disciplines.* This issue will focus on new, critical, and refocused aspects of all the intelligence disciplines and complementary intelligence capabilities. Deadline for article submission is 30 September 2020.

April–June 2021, *Intelligence Support to Information Warfare.* This issue will focus on the intelligence operations and activities that enable windows of opportunity in the information environment and cyberspace. Deadline for article submission is 17 December 2020.

Although MIPB targets quarterly themes, you do not need to write an article specifically to that theme. We publish non-theme articles in most issues, and we are always in need of new articles about a variety of subjects.

For us to be a successful professional bulletin, we depend on you, the reader. Please call or email me with any questions regarding article submissions or any other aspects of MIPB. We welcome your input and suggestions.

Tracey A. Remus
Editor

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We would genuinely like to thank CW4 Tim Zilliox, U.S. Army Central Command G-23 Collection Management, for the generosity of his time and knowledge as this issue's "stakeholder." He displayed a clear commitment to producing a quality publication throughout the development process.

FEATURES

DEPARTMENTS

Always Out Front

by Major General Laura A. Potter
Commanding General
U.S. Army Intelligence Center of Excellence

The field of intelligence analysis is at an inflection point. Behind us, several decades of accomplishment and innovation, chastened at times by errors and shaped by cautious incrementalism. Ahead, a future—as in all knowledge industries—still coming into view but shaped by the powerful and potentially disruptive effects of artificial intelligence, big data, and machine learning on what has long been an intimately scaled human endeavor, often more art than science, and dependent on individual insights and reputations.

—Joseph W. Gartin
Former Deputy Associate Director of CIA for Learning

The 2019 *Army Intelligence Plan* outlines the way ahead for the Army intelligence enterprise to synchronize our intelligence concept and capability development. In the plan, LTG Scott D. Berrier, U.S. Army Deputy Chief of Staff for Intelligence, G-2, says that "the requirement to operate faster and provide a clear intelligence picture to commanders is a direct result of the complexity of modern and future battlespaces."[1] Intelligence professionals face increasing challenges when conducting analysis given the complexity across all domains in the operating environment. These challenges include vast amounts of available information and the speed required to produce intelligence to help commanders make decisions in large-scale ground combat operations.

The term *big data* generally describes large volumes of data available for processing. It also represents data that is both structured and unstructured, which can quickly inundate an intelligence unit or staff. But the amount of data is not important—what matters is what organizations do with the data. We must arm our Soldiers—across all the military occupational specialties (MOSs) within the intelligence career management field (CMF 35)—with the skills to handle volumes of data, discern what is important, and process the information into actionable intelligence. Big data and the complexity of the modern operating environment will create ambiguity, and our Soldiers must be able to see through the ambiguity to articulate the actions of an adversary in a way that enables shared understanding.

Readiness requires a significant investment in developing our Soldiers' analytical skills. Our Soldiers must possess "the ability to conduct critical and creative intelligence analysis to support commanders' situational understanding in all operational environments."[2] Training, whether in the institutional or operational domain, must be sufficiently challenging and realistic to develop the skills our Soldiers require to compete and win in complex environments. We must ensure we provide enough repetitions to enable our Soldiers to acquire the proficiency to conduct analysis when conditions become difficult. In their book *Cases in Intelligence Analysis,* Sarah Miller Beebe and Randolph Pherson wrote, "The process is like starting a fitness regimen for the brain. At the beginning, your muscles burn a little. But over time and with repetition, you become stronger, and the improvements you see in yourself can be remarkable. Becoming a better thinker, just like becoming a better athlete, requires practice."[3]

Ensuring our analysts across all MOSs are capable of handling large volumes of data is not sufficient to stand alone. In order to maintain a competitive advantage over our adversaries, our Soldiers must be able to conduct analysis at the speed of large-scale ground combat operations. TRADOC Pamphlet 525-2-1, *The U.S. Army Functional Concept for Intelligence 2020–2040,* acknowledges this, noting that "future intelligence Soldiers must analyze large volumes of information rapidly and critically to provide analysis to decision makers."[4] To meet this requirement, we must develop ways to improve the speed at which we conduct intelligence analysis. *The Army Intelligence Plan* notes that we require "intuitive system interfaces to maximize [artificial intelligence/machine learning] AI/ML-enabled human-machine teaming."[5] Much of the analytic process is tedious and laborious and involves sorting through large volumes of data.

We must find ways to leverage our technological capabilities to gain efficiencies in this process.

Our approach to address this challenge begins with our doctrine. Doctrine must reflect the complexities and demands of the modern operating environment and provide the level of detail required to ensure understanding. Last year, we updated several publications, including ADP 2-0, *Intelligence*; ATP 2-01.3, *Intelligence Preparation of the Battlefield*; and ATP 2-22.9, *Open-Source Intelligence.* In January 2020, we revised ATP 2-33.4, *Intelligence Analysis*. The U.S. Army Intelligence Center of Excellence also created the TC 2-19.400, *Military Intelligence Training Strategy*, series of publications. All of these manuals nest with the Army doctrine published in FM 3-0, *Operations*, and FM 2-0, *Intelligence*, describing multi-domain operations and large-scale ground combat operations. Additionally, the revised ATP 2-33.4 addresses analysis of ill-structured problems in complex environments, drawing from doctrine outlined in ATP 5-0.1, *Army Design Methodology*.

In addition to doctrine, the Army will also engineer artificial intelligence technologies into military intelligence (MI) modernization programs to enable analysts to support tactical overwatch, targeting, and situational awareness with the speed, accuracy, and precision necessary for joint all-domain operations. In an age of ubiquitous sensing, teams of Soldiers, computers, and algorithms will ingest and transform thousands of squeaks, squawks, and pixels every few seconds into actionable intelligence. As technology matures, modernization efforts will get MI Soldiers out of the loop and, instead, put automation into the loop. This will allow analysts to manage autonomous and semiautonomous systems that never sleep, that never get bored, and that thrive at machine speeds with even the most mundane tasks. Artificial intelligence-enabled applications will improve hypothesis exploration, information search, and information validation. They will also help analysts to externalize intelligence problems, transferring those problems out of their heads and into an automated visualization that facilitates problem solving, reasoning, and all-source argumentation.

We will continue to improve our processes, capabilities, and doctrine to operate faster and provide a clearer intelligence picture to commanders. I am confident our Soldiers will have the tools, technology, and training they need to meet the challenges and demands of the changing character of war and win in a complex world.

Epigraph

Joseph W. Gartin, "The Future of Analysis," *Studies in Intelligence* 63, no. 2 (Extracts, June 2019): 1.

Endnotes

1. Department of the Army, Deputy Chief of Staff, G-2, *The Army Intelligence Plan* (Washington, DC, 2019), introduction.

2. Department of the Army, Training and Doctrine Command (TRADOC) Pamphlet 525-2-1, *The U.S. Army Functional Concept for Intelligence 2020–2040* (Fort Eustis, VA: TRADOC, February 2017), 39.

3. Sarah Miller Beebe and Randolph H. Pherson, *Cases in Intelligence Analysis: Structured Analytic Techniques in Action* (Thousand Oaks, CA: CQ Press, 2012).

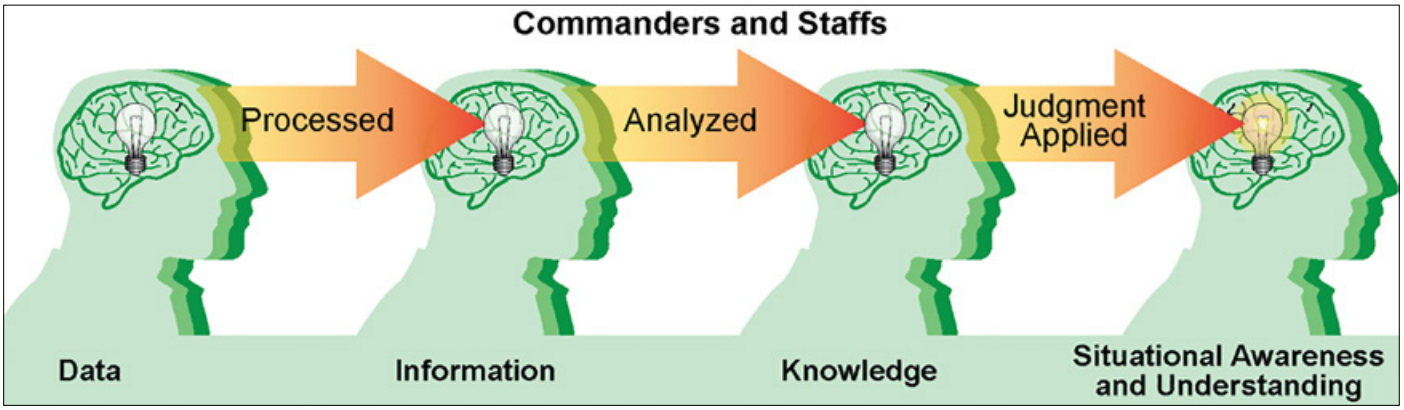
4. Department of the Army, TRADOC Pamphlet 525-2-1, *U.S. Army Functional Concept*, 30.

5. Department of the Army, *Army Intelligence Plan*, 5.

Always Out Front!

Building Knowledge and Understanding

Analysis is the compilation, filtering, and detailed evaluation of information to focus and understand that information better and to develop knowledge or conclusions. Analysis performed by intelligence personnel assists in building the commander's knowledge and understanding.



Achieving situational awareness and understanding

CSM Forum

by Command Sergeant Major Warren K. Robinson
Command Sergeant Major of the MI Corps
U.S. Army Intelligence Center of Excellence

Most people outside of military intelligence (MI) refer to MI Soldiers as intelligence analysts, but many MI Soldiers consider themselves *collectors* not *analysts*. There is an element of truth to both ways of thinking; however, in reality, MI Soldiers are indeed intelligence analysts. Basic analysis is the responsibility of every intelligence professional. It is also accurate to recognize that all-source intelligence analysts (military occupational specialty [MOS] 35F), signals intelligence analysts (MOS 35N), and geospatial intelligence imagery analysts (MOS 35G) have unique skills to analyze collected information. When you look at it, to be a good collector you have to have some level of analytical skills. The need for MI professionals to hone their analysis skills will be far more important in order to maintain a relevant pace as our Army transitions to performing multi-domain intelligence in support of large-scale ground combat operations and joint all-domain operations against a peer or near-peer threat.

We have a battle-hardened force that has been at war for many years conducting counterinsurgency and stability operations. Now we must look at how we will fight in large-scale ground combat operations against a threat with many of the same capabilities as our military. This requires us to grapple with the implications of operating in an environment with degraded, intermittent, and limited (DIL) communications. We must update our doctrine, tactics, techniques, and procedures to account for these challenges. This dynamic is not completely new, as our oldest generation of Soldiers remembers preparing for large-scale combat against the Soviet Union. The primary differences are the new capabilities available on the battlefield and the likelihood a peer or near-peer threat will employ hybrid capabilities. The information environment, electromagnetic spectrum, and robotics, to name a few, have significantly affected how we must train intelligence Soldiers across the myriad aspects of all of the domains. Fighting in ground combat operations no longer means an analyst can only consider ground capabilities.

Since there may be periods of time when we will not have ready access to some communications or information collection capabilities, we need to plan how we as intelligence professionals will continue to provide relevant information to commanders, no matter what the circumstances. Most understand that establishing a primary, alternate, contingency, and emergency or PACE plan is key to ensuring redundant methods of communication are in place. What if we apply a similar construct for intelligence? Understanding the enemy and conducting analysis with last known intelligence are a big part of the answer.

Fundamental to intelligence is the requirement to provide the commander with the most accurate, relevant, and predictive intelligence on the threat's course of action. When there are gaps in our data due to the uncertain nature of the operational environment, we must accept and embrace ambiguity, utilize critical thinking, and apply our analytic techniques to the information we have. Through these actions, we can provide the commander with the best analytical determination of what is relatively certain and what is unknown.

It almost seems unreal, but there was a time when intelligence was produced without the sophisticated capabilities we have today. And we did it well. It may be helpful to dust off some of those manuals and relook at the tactics, techniques, and procedures from the past to plan for some of our future contingencies. In this issue, the article by 1LT Christopher Counihan presents an analog methodology for comprehensive analysis with similarities to these "old school" procedures. Regardless of what capabilities are available, every intelligence discipline has something to bring to the fight based on its collection and analytical capabilities.

Finally, my thoughts turn back to training. Training is everything and everything is training. It is up to commanders to provide the resources and schedule the time to train Soldiers to standard. Officers, warrant officers, and noncommissioned officers must carefully plan training. Noncommissioned officers conduct training that will allow our Soldiers the "sets and reps" necessary to analyze data in both old and new ways. We cannot afford to get too comfortable; we must get this right!

Always Out Front!

Technical Perspective

by Chief Warrant Officer 5 David J. Bassili
Chief Warrant Officer of the MI Corps
U.S. Army Intelligence Center of Excellence

Springtime greetings to you all from the high desert mountains of southeastern Arizona. This time of year is increasingly important to many of our warrant officers, as it signals the closure of the My Board File application that supports the annual promotion selection board. If you have not already done so, ensure you certify your files and complete any administrative actions, including any complete the record officer evaluation reports and updated Department of the Army photos, no later than 8 April 2020. Best of luck to all who are being considered by the board.

This is also the time of year when many of you will begin the summer permanent change of station move cycle. Fresh out of the inaugural run of the Army Talent Alignment Process (ATAP), many will be reporting to their top choice assignment. ATAP is an exciting change in the Army's transformation from an industrial to an information age personnel management system. As this transition continues to occur, I remind everyone that it is not going to work perfectly for every mover or every unit and that receipt of assignment orders is still the closest thing to a guarantee you can expect. I also think it is extremely important that everyone understand a few points that are not changing within this system.

First, the Army will remain a requirements-focused organization. Both forecasted and unforecasted manning requirements will always drive the assignment environment. Unforecasted requirements not only disrupt individual Soldier preferences in the market but also unit preferences and requisitions. You and a unit may have reached consensus on number 1 picks, but an unforecasted requirement for a unit higher on the Active Component Manning Guidance may have forced Human Resources Command to remove your number 1 choice from the market to meet the unforecasted requirement.

Second, while the Army is giving you greater choice in choosing your next assignment, the choice comes with the possibility for increased risks to your career progression and promotion potential. There is a growing indication that many officers are making geographic and like-unit decisions as opposed to career-enhancing decisions as their top assignment choices. I am not suggesting that Hawaii and Florida are career enders, but I am suggesting that not seeking positions of increased responsibility and professional growth could affect your promotion potential. Take for example a chief warrant officer 3 with the military occupational specialty 350F (All-Source Intelligence Technician) and previous assignments within a military intelligence brigade-theater (MIB–T), National Ground Intelligence Center, and another MIB–T. This 350F then chooses to preference another U.S. Army Intelligence and Security Command (INSCOM) assignment higher than a U.S. Army Forces Command (FORSCOM) or Training and Doctrine Command (TRADOC) assignment during his/her upcoming move cycle. A promotion board "**COULD**" view this 350F as successful only within INSCOM assignments, with limited potential outside of INSCOM. The same scenario could also occur for those staying within FORSCOM, special operations forces, or TRADOC. Performance is normally messaged as the number 1 measure for promotion, so the above example may not always apply for a consistent top performer (Most Qualified). I cannot stress enough the importance of warrant officers seeking diverse assignment paths to expand their base of knowledge and experiences. Personally, I am a huge supporter of this new process, but there are many factors you should consider when making your assignment preferences and assessing the potential impacts of those choices, both personally and professionally.

The topic of assessing factors and impacts lends itself to the theme of this quarter's *Military Intelligence Professional Bulletin*—Intelligence Analysis. As one of our warfighting function's four core competencies, intelligence analysis is the function we provide that enables a commander's decision making. As stated in the newest version of ATP 2-33.4, *Intelligence Analysis*, both single-source and all-source analysts participate in intelligence analysis. This is not just a "Foxtrot" mission. Much like your individual role in assessing factors and evaluating choices for a future assignment, intelligence analysis is about evaluating all available data relative to an enemy or threat and the mission of your unit in a timely manner to enable the commander to make the right decision. Military intelligence

analysts perform this role by developing a deep understanding of the enemy/threat, all aspects of the terrain in a given area of operation/interest, and both intelligence and operational doctrine. Applying analytical tradecraft is both an art and a science. The science comes from the use of applying structured analytical techniques (SATs) such as intelligence preparation of the battlefield or more advanced SATs such as analysis of competing hypotheses. The art is achieved through experience and implementation of the appropriate SAT for the right mission or the right time, combined with the individual analyst's understanding of the deep enemy/threat, terrain, and doctrine. Understanding, acknowledging, and attempting to counter your individual cognitive biases further contributes to the art and science of analysis.

The greatest challenge to effective analysis is the ability to process and exploit the growing amount of data we can access. Technological advances such as artificial intelligence and machine learning algorithms will greatly alleviate the cognitive burden of processing and exploiting these large data stores, but they will continue to require analysts to apply their critical thinking skills to assess the data. Even with these new capabilities, analysts and their technology will very likely not have access to all the data they need. This is when analysts apply judgments of probability based upon all available, relevant data and their experience and knowledge—the art and science of analysis.

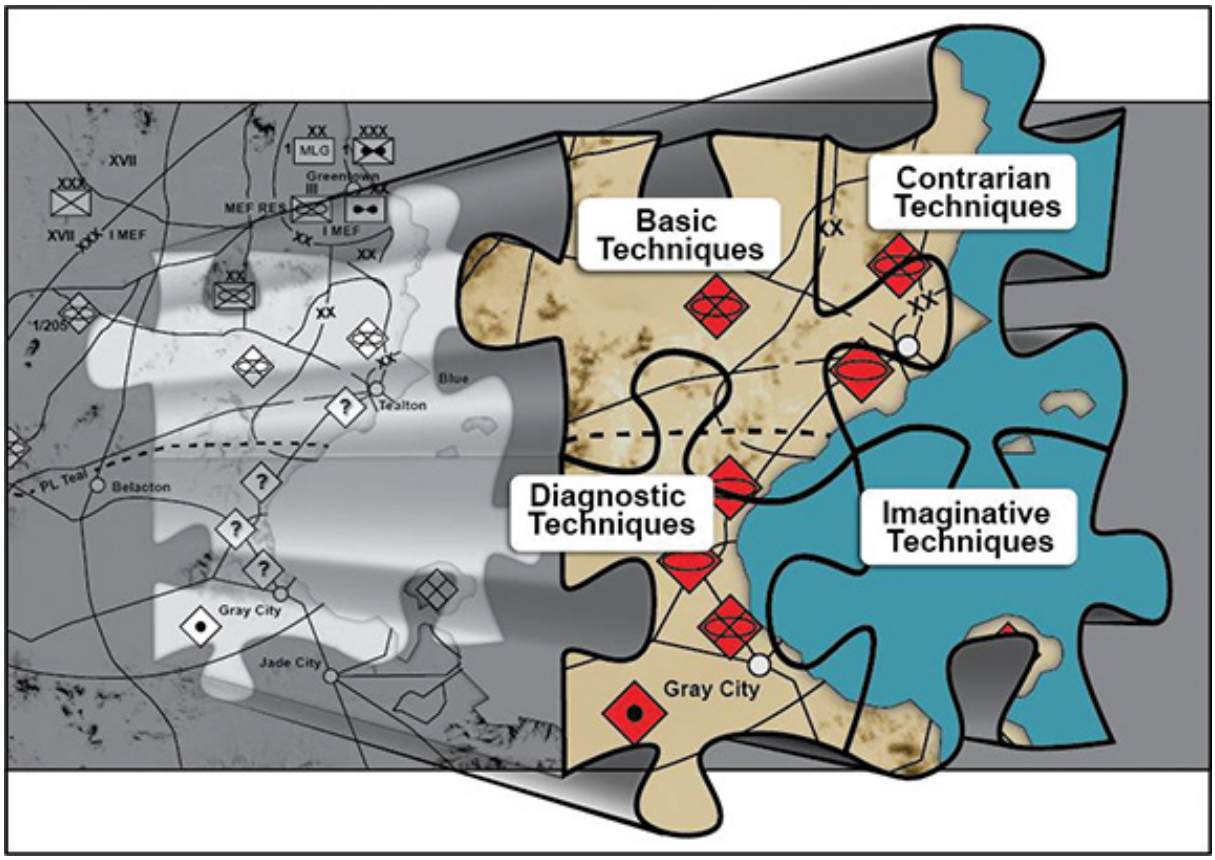
I encourage all military intelligence professionals to give ATP 2-33.4 a few good reads, become aware of your biases, and test out a few of the SATs when you need to make a timely, relevant, and important decision. Thank you all for what you do for our Army each and every day.

Always Out Front!

Structured Analytical Techniques

Structured analysis assists analysts in ensuring their analytic framework—the foundation upon which they form their analytical judgments—is as solid as possible. It entails separating and organizing the elements of a problem and reviewing the information systematically. Structured analytic techniques are categorized as the following:

- Basic—provide insight that supports problem solving.
- Diagnostic—make analysis more transparent.
- Advanced:
  - Contrarian—challenge current thinking.
  - Imaginative—develop new insights.



Applying analytic techniques to understand the operational environment

The Thoughtful Analyst: Enabling Critical Thinking in Intelligence Analysis

by Lieutenant Colonel Brian Gellman

Making predictions is hard, especially about the future.

—Yogi Berra
Professional baseball player

Introduction

The intelligence profession exists in a complicated, complex environment. The 2018 National Defense Strategy (NDS) describes a strategic environment with the reemergence of long-term, strategic competition with revisionist powers such as China and Russia, as well as rogue regimes in Iran and North Korea. The NDS also describes a security environment affected by rapid technological advancements and the changing character of war. Among the many NDS solutions, the Department of Defense is accelerating modernization programs, specifically in the realm of artificial intelligence and machine learning. All of this may seem unprecedented, but it is not.

In post-World War II and the early days of the Cold War, a nascent U.S. intelligence community faced a similar uncertain world, and like today, it had access to emerging forms of collection and data management. Sherman Kent, who is commonly credited with professionalizing the U.S. intelligence community, described this period of U.S. history in his 1949 book *Strategic Intelligence for American World Policy*. When reflecting on his book 15 years later, Kent noted that no matter how complicated or complex the environment and no matter how sophisticated the means of collecting and storing data, there will never be a replacement for the thoughtful analyst.[1]

Artificial intelligence and machine learning will change the intelligence profession in the same way satellite surveillance and computers changed the intelligence profession for Kent, but they will not replace the need for a thoughtful analyst. Kent recognized that employing new technologies in the early Cold War required innovative, adaptive, and critical thinking problem solvers to enable intelligence analysis in the new environment. The same holds true for today's intelligence analysts.

ADP 2-0, *Intelligence,* defines intelligence analysis as the process by which collected information is evaluated and integrated with existing information to facilitate intelligence production. ADP 2-0 further states that the following attributes enable an analyst to effectively provide staff support and intelligence analysis: critical thinking, embracing ambiguity, and collaboration.[2] The purpose of this article is to provide military intelligence leaders with ideas on how they can foster an analytical environment that enables these attributes by reflecting on—

- How we make decisions and judgments.
- How we evaluate arguments and evidence.
- How we can benefit from collaboration and diversity of thought, as they can result in innovative analysis.

Intelligence Analysis

Critical thinking. Critical thinking is essential to analysis. Using critical thinking, which is disciplined and self-reflective, provides more holistic, logical, ethical, and unbiased analysis and conclusions. Applying critical thinking ensures analysts fully account for the elements of thought, and standards of thought, and the traits of a critical thinker.

Embracing ambiguity. Well-trained analysts are critical due to the nature of changing threats and operational environments. They must embrace ambiguity, and recognize and mitigate their own or others' biases, challenging their assumptions, and continually learn during analysis.

Collaboration. Commanders, intelligence and other staffs, and intelligence analysts collaborate. They actively share and question information, perceptions, and ideas to better understand situations and produce intelligence. Collaboration is essential to analysis; it ensures analysts work together to effectively and efficiently achieve a common goal. Often analytical collaboration is enabled by [Department of Defense] DOD intelligence capabilities.

—ADP 2-0, *Intelligence*[3]

Thinking about Thinking, aka #metacognition

It is the mark of an educated mind to be able to entertain a thought without accepting it.

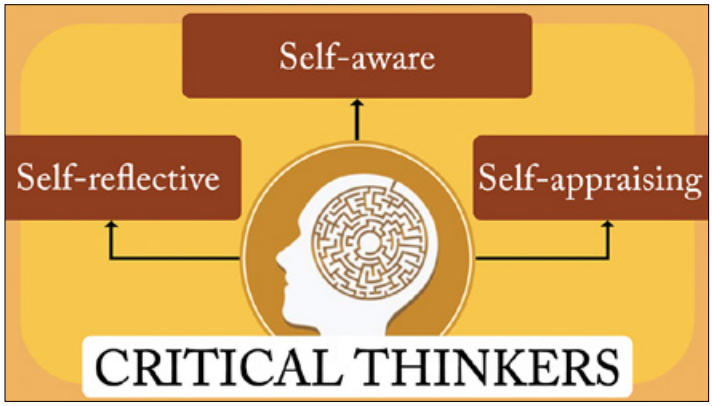
—Aristotle

Just as we can train a Soldier to fire a weapon, we can train a Soldier to think critically. When you train a Solider to shoot, you divide the task into increments. It starts with good body positioning, stance, and grip. Once the Solider has a good firing position, the next step is learning sight picture, breath control, and aiming. Finally, the trigger squeeze

completes the primary task; however, many other tasks complement shooting, including immediate action drills, remedial actions, and weapons maintenance.

When we train Soldiers to shoot, we don't hand them the weapon and say, "Go shoot!" We divide the task into subtasks, train each subtask separately, and then put them all together. We have to take the same reductionist approach when we train Soldiers on how to think critically. We cannot hand the Solider a laptop and say, "Go think critically!" We have to divide the experience into smaller chunks.

According to the American Philosophical Association, "critical thinking is the process of purposeful, self-regulatory judgement. This process gives reasoned consideration to the evidence, context, conceptualizations, methods, and criteria."[4] In other words, critical thinkers consider the problem holistically. Critical thinkers are aware of their approach to making judgments and the things that may influence and hinder those judgments.



Critical thinkers must first understand themselves

The first subtask in critical thinking is metacognition, which is thinking about thinking. When first learning how to shoot, the new Solider has to think about shooting. Shooting only becomes automatic through deliberate practice and repetition. New shooters have to think about their positioning, their target, their point of aim, and their breathing. When learning how to think critically, the new analyst must think about thinking. It works the same way. Critical thinking must also be trained through deliberate practice and repetition. Only with practice can thoughtful analysts become aware of their limitations, preconceptions, and biases.

We have to start by knowing our limitations. Critical thinkers must be self-reflective, making an honest self-appraisal of what they do and do not know. In the intelligence field, what we know is often dwarfed by what we do not know, so one would think it is easy to be humble. However, admitting you don't know something requires letting go of your pride and ego. Analysts may be concerned that admitting a knowledge deficit is admitting a weakness and that it may negatively affect their credibility. In truth, it is the opposite. Disclosing what you don't know is a sign of maturity and wisdom.

Paradoxically, admitting knowledge deficits may be easier for junior analysts than for senior (mature) analysts. Junior analysts may feel more open to admitting ignorance of a topic, whereas senior analysts may fear the loss of credibility with their leadership and will "fake it until they make it." This is a selfish and counterproductive approach. As leaders, we have to encourage our Soldiers not to be afraid to admit when they do not know something. We must also lead by example and humbly admit our own limitations and knowledge deficits. This approach will better enable a critical-thinking environment.

Preconceptions are another pitfall the thoughtful analyst must be aware of because we all have them. In fact, the more experience we have, the more preconceptions we have. As an old boss used to tell me, "We are all victims of our experiences, and now you are all victims of mine." This leader was keenly aware that our experiences inform our judgment, for good or for bad, and he was warning us that his preconceptions would be a driving force in our organization. There is nothing wrong with having preconceptions as a critical thinker; however, we must be actively aware of how they influence our judgment.

Finally, an analyst must be aware of his or her biases. Biases are implicit shortcuts that our brain takes to solve problems and make judgments. Our cognitive faculties will take the path of least resistance to come to a conclusion. This is perhaps the hardest metacognition task because "implicit" means we may not be aware we are doing it. In order to understand how we make decisions or judgments, we have to understand how our brain works.

Richards Heuer, a career analyst at the Central Intelligence Agency, wrote a book in 1999 titled *Psychology of Intelligence Analysis*. In his book, he describes how we perceive things and how our memory works. He further explains how these cognitive processes lead to biases in how we evaluate evidence, how we estimate probabilities, and how we perceive cause and effect. Additionally, he states that our viewing of events in hindsight can actually reinforce our faulty reasoning. Heuer also suggests strategies and analytical frameworks to mitigate the effects of our own biases on our reasoning. The book's introduction includes a summary of Heuer's central ideas with regard to the cognitive challenges intelligence analysts face: "The mind is poorly 'wired' to deal effectively with both inherent uncertainty (the natural fog surrounding complex, indeterminate intelligence issues) and induced uncertainty (the man-made fog

fabricated by denial and deception operations)."[5] Heuer believes that making the analyst aware of how the brain works, of the heuristic tools and shortcuts that our cognitive faculties use, will result in an analyst being less likely to fall prey to distorted and subjective reasoning. Every thoughtful analyst should read Heuer's book, which is available online.[6]

Evidence Evaluation, aka #beliefsvsfacts

The important thing is not to stop questioning. Curiosity has its own reason for existing.

—Albert Einstein

Acknowledging limitations and awareness of our own personal preconceptions and biases is important in self-assessment. After an analyst looks within, the next step in critical thinking is recognizing the difference between assertions and evidence. An assertion is a statement of a belief. We make assertions when we provide intelligence estimates or assessments. To strengthen an assessment, analysts must view their assessment as making an argument. A good argument provides evidence in the form of observable, verifiable facts or sound reasoning to support the assertion. Too often, analysts will support their assertion with other assertions without realizing it because they don't think in terms of assertions and evidence—beliefs versus facts.

During mission analysis, it is sometimes necessary to make assumptions for planning. An assumption is a belief based on a valid fact. In intelligence analysis, we also have to make assumptions. We assume the enemy is following their doctrine, we assume the enemy is seeing the same battlefield that we are, and we assume the enemy defines victory in the same way we do. Are these valid assumptions? Do we treat them like beliefs or facts? Thoughtful analysts must be aware that assumptions are beliefs and must identify them as part of the assessment. They must constantly challenge the assumptions until proven as facts. An argument based on assumptions can lead to a false sense of certainty. Clearly identifying assumptions provides greater transparency about what analysts know versus what they think they know.

GEN Colin Powell said to his briefers, "Tell me what you know. Tell me what you don't know. Then you are allowed to tell me what you think." A good drill that leaders can use to meet GEN Powell's briefing requirements—reinforce the difference between beliefs, facts, and assumptions and encourage creative thinking—is called "See, Think, Wonder." In this drill, analysts are provided an intelligence product, or even a piece of artwork, and are asked to describe what they see, what it makes them think about, and what it makes them wonder.[7]

For example, an imagery product depicts a tank at a known location on a map at a specific time. The tank is a T-72 and is in a defensive position. This is what the analyst can *see.* What they *think* is their assessment of what they believe is happening that they can't see. They *think* that there are more tanks and that these tanks are in a defense. The idea that there are more tanks is not an observable fact; it is an assertion. They assume the adversary is following their doctrine, and by doctrine, the adversary does not defend with a single tank. Based on these assumptions, assessing that more tanks are in the area is a good assertion because it is supported with factual evidence about how we know the enemy fights. Next, the analyst describes what they *wonder,* or what they don't know. They *wonder* not only where the other tanks are, but also where their lines of communications are. Where is their maintenance area? Will they stay in the defense, or will they transition to the offense? When we *wonder,* we are expanding to the second and third levels of the problem we are observing by asking questions. This exercise takes analysts through a deliberate thought process that separates what they *see* (observable facts) from what they *think* (assertions or assessments) and takes them to the next level of critical thinking by *wondering* what else they need to know.

Ambiguity is Ambiguous aka #itscomplicated

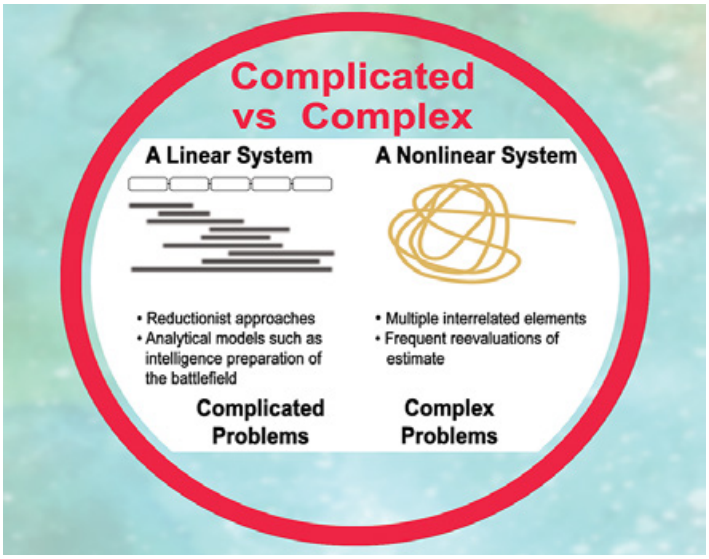
I wanted a perfect ending. Now I've learned, the hard way, that some poems don't rhyme, and some stories don't have a clear beginning, middle, and end. Life is about not knowing, having to change, taking the moment and making the best of it, without knowing what's going to happen next. Delicious Ambiguity.

—Gilda Radner
Comedian and actress

When defining the role of intelligence, a common response is "to reduce uncertainty." Ambiguity leads to uncertainty, and uncertainty can result in discomfort. We can never truly eliminate uncertainty; we can only hope to reduce it. Even after an event occurs, we still cannot eliminate all uncertainties that surround the event. To be successful, analysts must be comfortable with an ambiguous environment in which uncertainty is high. The thoughtful analyst accepts the "delicious ambiguity."

Reducing uncertainty through thoughtful analysis is difficult because intelligence has both complicated and complex problems. For the purpose of this article, a complicated problem has a relatively small number of possible outcomes and can be solved given multiple perspectives and the right data. A complicated problem can be compared to advanced mathematics, where given sufficient data and an understanding of the math, an answer can be determined through finite direct-causal (linear) relationships. How an enemy defense

is set up and when they will transition to the offense is complicated and requires knowledge about the enemy, the terrain, the operational environment, and the leaders' decision-making process. However, a single truth is out there waiting for the analyst to discover it, if given sufficient data. In most cases, the analyst will be able to narrow it down to a couple of high probability courses of action.



Complicated vs Complex Problem Solving

On the other hand, in a complex problem, too many variables exist, both dependent and independent, for the analyst to consider every single possibility. Complex problems tend to be nonlinear, and the problem cannot be reduced into smaller parts to understand the whole. Consider ecological and biological systems as examples. It was not easy for Hawaiian sugar farmers to predict that introducing mongooses into the local ecosystem to control rats would result in endangering local bird and turtle populations (while failing to control the rats). Or a physician attempting to diagnose a headache may be able to eliminate the most serious causes, such as a brain tumor, but never learn the true cause because too many unique variables exist, such as environment, genetics, nutrition, pharmacology, allergies, and psychology. In this complex system, the actions the physician takes might have unintended consequences that make the condition worse. The "cure" might be worse than the disease. This is also true in intelligence, when an intelligence-driven activity inadvertently creates the conditions the intelligence was intended to assess or avoid.

The thoughtful analyst must recognize the difference between complicated problems and complex problems because solving them requires a different approach and may result in different levels of uncertainty. In complicated problems, what we know is often more than what we don't know. It is a linear system whereby the analyst can use reductionist approaches, dividing the problem into smaller parts that add up to an understanding of the whole. At the conclusion of a complicated problem, we often learn the answer, even if in hindsight. For example, predictive analysis on improvised explosive device emplacement locations, high-value target locations, or a tank division's defensive posture is a complicated problem that can be divided into parts to explain the whole. With enough data, the analyst can build predictive templates to a high degree of accuracy leaving only a finite amount of information requirements to confirm or deny the templates. For complicated problems, analytical models such as intelligence preparation of the battlefield (IPB) or operational environment can be used as an analytical framework to reduce uncertainty.

Reducing uncertainty in a complex problem is less likely to allow for templates because it usually represents a nonlinear system for which reductionist approaches will not work. In a complex problem, what we know is often insignificant compared to what we don't know, and even after a complex event occurs, we may still not understand the true nature of what happened and why. An example of a complex problem is the Arab Spring. How did protests in one Arab country spread to another, then another, and then another? Social media? Wheat crop failures? Globalization? Climate change? Authoritarian regimes? The complex answer is probably yes and no to each of these questions. Each likely had a role, but no single factor could have caused the Arab Spring. Will there be another similar Arab Spring event, and if so, what are the indicators? To reduce uncertainty for this kind of complex problem, you have to consider your analytical approach, build a team of diverse thinkers, and frequently reevaluate your estimate.

Approaching a complex problem is much more difficult for analysts, especially in the Army because we do not have a lot of doctrine that helps us to do this. IPB can serve as a starting point for discussion, but ultimately it isn't suitable for handling complex problems. Heuer provides a description of the analysis of competing hypotheses (ACH), offering analysts another tool that may be more suitable for complex environments. ACH is better equipped to handle complex situations in which there is a wide range of possible outcomes and variables. No perfect model exists, hence the difficulty. Leaders should research and try out different analytical models on complex problems until they find something that works best for the specific problem set and the organization. Don't be afraid to try multiple methods; anything that gets the group thinking in new ways has value.

In addition to considering analytical tools, as part of the self-assessment, the analyst should recognize requirements

for expertise that does not reside on the team. Because of the nature of complex environments and the vast number of variables involved, leaders will likely have to include additional subject matter experts to provide new perspectives on relationships in the complex problem. (Collaboration is discussed further in a later section.)

Finally, we have to be keenly aware that the estimate can and should change. When problems drag on, when they seem to move from complicated to complex, we sometimes attempt to simplify the problem. We tend to use two fallacious models in these situations. The most common model is based on the assumption of linear progression. We have data points that result in a straight line, like a stock that starts at $5, in 6 months is $10, and in 12 months is $15. A linear progression assumes that the stock will be $20 in 18 months. However, if you are a stock investor, I hope you are not investing solely based on this method. This is a fallacy because conditions drive the movement of the stock up, and without knowing these conditions, you are investing on an observed trend and hope, not on an understanding of the trend. Despite this clear example of a poor investing strategy, we see analysts who assume a linear progression without understanding the underlying conditions. If you don't understand the conditions, then your estimate is only a guess based on a straight line and nothing else. Hope is a method, but not the preferred one for the thoughtful analyst.

Another fallacious model we use, especially in extended deployments or persistent problem sets, is incremental analysis. Beware the dangers of incremental analysis and confirmation bias. In the incremental analysis trap, we begin with an estimate and each day look for evidence (reporting) to support that estimate. This commonly occurs when we produce daily intelligence summaries. We tend to focus more on data that confirms our theories, and we discount or explain away evidence that refutes our estimate. As Heuer observes, "New data received incrementally can be fit easily into an analyst's previous image. This perceptual bias is reinforced by organizational pressures favoring consistent interpretation; once the analyst is committed in writing, both the analyst and the organization have a vested interest in maintaining the original assessment."[8]

To avoid incremental analysis, analysts must be able to think critically about their own assessment, and leaders must be willing to accept a morphing estimate. Applying what they know about their own limitations, their preconceived notions, and their biases, thoughtful analysts ask out loud, "What if I am wrong? What piece of evidence that I used to construct my assessment is most vulnerable? If that evidence proves false, does it change the entire assessment?" For enduring problems, these questions should be asked regularly (weekly, monthly, and yearly) at which time a team of analysts reviews estimates and reevaluates all evidence presented during that period to ensure the estimate is still valid. It is especially important to review evidence that was previously discounted to ensure the evidence wasn't discounted out of bias toward the preferred estimate. Allowing an estimate to change over time may be hard for an analyst because the intelligence consumer may see this as flip-flopping or being inconsistent. However, the thoughtful analyst has to overcome these pressures.

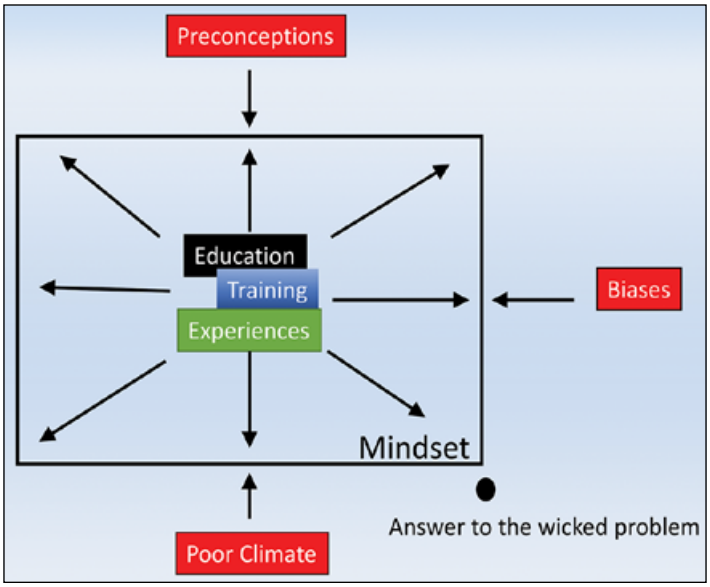
Collaborative Innovation aka #thinkoutsidethebox

If you haven't read hundreds of books, you are functionally illiterate, and you will be incompetent because your personal experiences alone aren't broad enough to sustain you.

—GEN James Mattis
Retired U.S. Marine Corps and former Secretary of Defense

Think outside the box. I can't stand that cliché. Thinking outside your "box" is not possible because your "box" is your mindset. Your mindset is a result of your training, education, and experiences. Constraining the size of your "box" are internal and external factors that include biases, knowledge deficits, preconceptions, and stifling work environments. Answers that lie beyond your mindset are beyond your reach. You need growth or help to get there.

When people suggest you should think outside the box, they are looking for creativity. They are asking someone to create new connections, take innovative approaches, reevaluate existing data from different perspectives, or introduce new data that is seemingly unrelated. How can we



Thought Boxes

do this? How can we enable analysts to solve problems to which the answer lies outside their mindset? The answer is to help them grow the size of their box and to add more boxes.

This is not as difficult as it sounds. Your mindset is a result of internal growth (training, education, and experiences) constrained by your internal and external constraints. In the long term, we have to be lifetime learners, constantly striving to expand our mindset though training, education, and experiences. We can do this through reading (self-education), accepting new experiences (assignments outside our comfort zone), and always striving to learn about new technologies. We can also accomplish this by being aware of the biases and preconceptions constraining our growth.

In the short term, to solve the wicked problem of the day, we can identify our knowledge deficits and research the problem. When this research isn't sufficient, or if our limitations in the form of internal biases or culture constrain our thinking, it is time to bring in another mindset to help us. We need more boxes.

Exercise 1: See, Think, Wonder Applied. Try this example using a work of art. The picture in Figure 1 is of a display of art from the Chinese dissident Ai Weiwei.

Make a list of what you *see*, what you *think*, and what you *wonder*. After writing down what you *think*, take the time for an internet search on the artist to stimulate further thoughts and write down additional thoughts, categorized as what you *think,* or assess, and what you *wonder,* or don't know. Highlight these new thoughts stimulated by your research. Ask someone else to do the exercise, but do not collaborate yet. Work on it independently. When complete, compare your table, your coworker's table, and my table, shown in Figure 2 (on the next page). Then write down anything new that you *think* or *wonder* about after collaborating with others and highlight these new ideas.

After comparing your notes to Figure 2, did you see anything you didn't observe or think about? Did that stimulate new thoughts? When you include a second or a third analyst in the exercise, each potentially seeing different observable facts, and very likely thinking and wondering in different directions, the analysts will be able to make connections and ask questions they may not have developed on their own.

Exercise 2: Brainstorming to Creativity. After using the See, Think, Wonder exercise to examine the artwork, you should have developed questions that require answers. Intelligence analysis often requires analysts to think creatively and with imagination to develop theories to explain what they see and what they think. Brainstorming is an excellent tool for drawing out a variety of creative answers to a problem. However, to be effective, the facilitator of the brainstorming session must establish and enforce four rules:

Figure 1. Work of Art Example

What I See	What I Think	What I Wonder
• Multiple urns from the Han dynasty painted over. • Ai Weiwei dropping an urn with an unconcerned look on his face.	• Research suggests that urn is from the Han dynasty. • The dropped urn was likely worth a lot of money. • This is likely a political statement against the Han Chinese-run government.	• The Han Chinese have majority control of the People's Republic of China, so was this an attack on them? Was it perceived as such? • Is Ai Weiwei very wealthy? Or does he have wealthy benefactors who are financing his veiled political statements? If so, who are they?

Figure 2. Author's See, Think, Wonder Table

- ✦ Do not allow criticisms or negative judgments.
- ✦ Arrange for a relaxed atmosphere.
- ✦ Think quantity, not quality.
- ✦ Add to or expand on the ideas of others.[9]

For this exercise, the question is, "How did Ai Weiwei acquire the urns he painted and destroyed?" Applying the rules of brainstorming, encourage a group to provide at least 100 possible solutions. That sounds like a ridiculous number; however, it is very achievable. Use a whiteboard so that everyone can see each other's ideas to build on. When an idea is especially good, the facilitator should encourage the team to drill down on that idea and create additional variations. For example, rich benefactors who intend to discredit the Chinese government may support Ai Weiwei. The facilitator should prompt, "Who?" Drilling down to this idea may result in a long list: the U.S. Government, Russian government, Russian mafia, Chinese mafia, Chinese dissidents, Uighurs, Free Tibet protestors, Hong Kong protestors, Anonymous, or aliens. The list of people, organizations, or governments that could support this effort may account for 20 to 30 ideas alone.

Rules of Brainstorming[10]

1. No criticisms or negative judgments are allowed. These come later, after the session is finished. The basic idea is to obtain new ideas and not to rate them. The introduction of criticisms, judgments and evaluations will stop the flow of creative ideas by making individuals defensive and self-protective, and thus afraid to introduce truly new and different ideas for fear of ridicule.

2. Arrange for a relaxed atmosphere. If the environment is noisy, crowded or full of distractions, concentration will be lost. Also, the positions and personalities of the participants are important. An autocratic supervisor could ruin a session if people are afraid of appearing "silly" and thus do not speak up when they have novel ideas.

3. Think quantity, not quality. The point of brainstorming is to obtain large numbers of different types of ideas. Again, judgments come later when ideas which do not look promising can be filtered out. By concentrating on quantity, the subconscious is encouraged to continue making new connections and generating more ideas.

4. Add to or expand the ideas of others. This is not an ego-building contest, but a group effort to solve a common problem. A basic premise is that ideas from one person can trigger different ideas (some closely related and some not so closely related) in other people. That is why this technique works better in a group, as opposed to when used in isolation.

—G. Venkatesh
"Follow Brainstorming Basics to Generate New Ideas"

After a fixed period of time or when it is obvious the group has reached the point of diminishing returns and focus, then and only then the group will evaluate the quality of their ideas. Some ideas may be dismissed right away after brainstorming, such as financial support from extraterrestrials. Ideas that are more reasonable may be ranked in terms of likelihood. The group will also divide the ideas into broader categories to better organize the most likely answers. In this example, this exercise would stop here; however, in an intelligence problem, the next step would be to establish a collection plan to help confirm or deny the most probable theories.

In these exercises, you expanded your own mindset by researching the artist, by laying your box alongside the box of a coworker, and by getting new ideas from the author that you did not have before your collaboration. This exercise is an overly simplistic demonstration of something you already know—two heads are better than one. But are they? What happens if both analysts' mindsets are essentially the same?

To expand the collective box or mindset of a group, it is important to have diversity in thought. This does not mean diversity in an equal opportunity context. This is not about ethnicity; this is about thinking differently. Two analysts who are of different ethnicities but share the same training (for example, at Fort Huachuca, Arizona), same college education, and similar experiences (tactical military intelligence) may still have boxes that closely converge, leading to similar thought outcomes and groupthink. To achieve an optimally diverse collective mindset, the leader should assemble a group with sufficient diversity in experience, education, and training to give you the best opportunity to find that answer outside your box.

One potential solution is to bring in expertise from outside the intelligence section. We used to call this "reverse BOS [battlefield operating system]." (The battlefield operating system was the equivalent to what we know today as the warfighting functions.) We would ask logisticians to

put on the red hat and develop adversary logistics plans for the overall enemy course of action. The air defense officer would suggest the location of the adversary air defense units on the map to best match capabilities to terrain and mission. As part of developing the enemy course of action, reverse BOS brings diverse mindsets into a collaborative product.

In multinational efforts, partner forces could also bring a diverse way of thinking, especially when tackling the problem of cultural mirror imaging whereby our own culture constrains our mindset. As information security and legal requirements allow, analysts can invite members from industry and other nonfederal entities. Of course, all good things should be in moderation. If their thinking is too divergent, it will not work because people will not be able to understand each other's point of view. Even if their combined boxes cover the answer, they may not be able to communicate with each other in a way that allows the team to find it. In other words, diversity of thought is essential, but you can have too much of it. The thoughtful analyst has to be aware of when this becomes counterproductive.

Conclusion

A thoughtful analyst is a critical thinker who approaches a problem holistically. This analyst is aware of his or her own limitations, preconceptions, and biases and takes active steps to mitigate the vulnerabilities that constrain their thoughts and cloud their judgments. The thoughtful analyst is aware of which evidence is a fact and which evidence is based on reasoning or assumptions, and is constantly challenging those assumptions. The analyst must strive to grow his or her mindset as a lifelong learner through new training, education, and experiences. This includes professional reading in intelligence and other disciplines because it expands the analyst's mindset through diversity of thought.

Leaders have a responsibility to enable this growth and to establish and maintain a collaborate environment. Leaders must train analysts to think critically, evaluate evidence, and expand their mindset by encouraging analysts to deconstruct how they think, "show their math," and separate evidence from assertions and facts from beliefs. Leaders should establish diverse reading lists appropriate to their mission and schedule regular meetings to discuss and share ideas. It is also important that leaders allow analysts to explore different analytical models and demand constant reevaluation of estimates. Finally, leaders must build teams of critical thinkers that have sufficient diversity of thought while ensuring enough common ground to allow for the communication of ideas.

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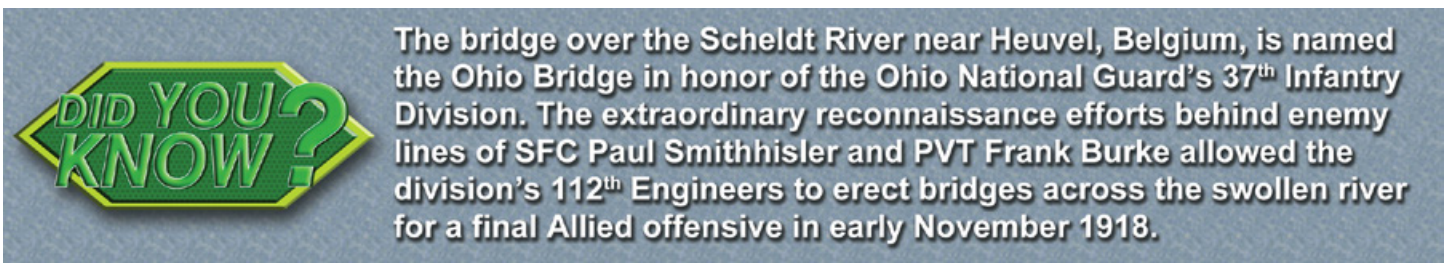

Winning with Artificial Intelligence

by Chief Warrant Officer 4 Timothy Zilliox

Introduction

The 2019 Army Modernization Strategy states that "future warfare will only expand in geographic scale, domains, and types of actors, while decision cycles and reaction times compress."[1] To address future warfare, our Army must continue to develop ways to leverage emerging technological advancements in computing to understand, visualize, decide, and direct faster than our competitors. China and Russia are already investing heavily in artificial intelligence. Rapid development and integration of this technology are critical to enabling commanders to counter adversaries in the information environment as effectively as in the physical domains and to win in the cognitive space.[2] We must outpace our adversaries if we are to win in a complex world.

Artificial Intelligence

The *Oxford English Dictionary* defines artificial intelligence as "the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages."[3]

Playing Smarter Baseball

Baseball has always been a game of numbers. Since its inception, managers, coaches, and fans have paid close attention to a player's "stats" and debated which players their team should hire. However, in 2002, Oakland A's general manager Billy Beane and Harvard economics graduate Paul DePodesta turned the baseball world upside down when they discovered that using new approaches to advanced statistical analysis enabled them to staff their baseball team with undervalued players, allowing them to acquire quality players while staying within their team's budget. Their approach proved successful, and Major League Baseball now widely uses it. It became the subject of the movie *Moneyball*, starring Brad Pitt. This marked the beginning of a new era of advanced analytics in baseball.

The next significant milestone in the evolution of analytics in baseball came in 2014, when Major League Baseball turned to Amazon Web Services to incorporate artificial intelligence into baseball analytics. With the introduction of Amazon's Statcast, the game is now more precise than ever. For example, managers have access to spray charts, which depict in graphical format where a batter is most likely to hit the ball, allowing the defensive players to shift accordingly to increase their chances of getting the hitter out. In 2018, Amazon introduced an interface that uses a combination of statistical analysis; sensors, including radar and cameras, positioned at multiple points around the baseball stadium; and situational analysis of unique factors in a game to predict the likelihood that a baserunner will successfully steal a base. Amazon's Statcast does this by crunching a variety of data points. These include a baserunner's known sprint speed, the distance of his lead off from the base (as collected by the in-stadium cameras), his stolen base success rate, the time it takes the pitcher to release the ball, the time it takes the ball to travel to the catcher, and the catcher's success rate throwing out baserunners.[4]

All of this in-game data is analyzed against a database of more than 1.5 million plays collected over the past 2 years, incorporating machine learning into the process. The system processes the data in a matter of seconds and displays it for managers and fans in real time. Amazon's next goal is to enable its interface to predict which pitches a pitcher will throw. The system will do this by analyzing the pitcher, the batter, the catcher, the in-game situation, and a database of plays given a similar game situation.[5]

The use of computer-accelerated, real-time, in-game analysis reveals minute details of players' behavior during a game. It also allows coaches to determine the best matchups, decide which throws by a pitcher are most likely to result in a hit, know which hitters are more likely to get on

base in particular situations, and make informed decisions about which players to use in given situations.[6] Imagine the advantage an army would have if it had computer-accelerated, real-time, in-conflict analysis to reveal minute details of the adversary's force to enable commanders to determine the best courses of action faster than the adversary.

U.S. Army photo illustration by Peggy Frierson

It's time for robots to replace Soldiers for certain specialized tasks involving "dull, dirty or dangerous work and to reduce their cognitive load," said retired MG Cedric T. Wins, former Commander of Combat Capabilities Development Command.

The Department of Defense Needs to Play Smarter Too

Like Billy Beane's Oakland A's, the Department of Defense (DoD) is developing new ways to analyze data to gain a competitive advantage. In pursuit of its quest to incorporate artificial intelligence into military applications, the DoD initiated a joint venture with Google in April 2017 dubbed Project Maven. The goal of the program was to develop ways the military could use artificial intelligence to enhance its defense capabilities. The program's pilot venture was to develop algorithms to interpret aerial video images from conflict zones, reducing the time it takes analysts to review thousands of hours of video to find information of intelligence value. However, because of protests from many of Google's employees, who objected to their company using its technology for military applications, the company announced its withdrawal from the program in 2018.[7]

Google's decision did little to slow the development of artificial intelligence in the military. In June 2018, the DoD created the Joint Artificial Intelligence Center to accelerate the delivery of artificial intelligence-enabled capabilities, synchronize the DoD's artificial intelligence activities, and expand joint force advantages.[8] In 2018, the Army issued Army Directive 2018-18, *Army Artificial Intelligence Task Force in Support of the Department of Defense Joint Artificial Intelligence Center*.[9] Funding for Project Maven, officially called the Algorithmic Warfare Cross-Functional Team, was $131 million in 2018.[10] In 2019, the Army awarded an $800 million contract over 10 years to develop intelligence data analytics and prediction software for inclusion in the Distributed Common Ground System-Army.[11]

Artificial Intelligence in Intelligence Analysis

Information overload is a significant challenge that intelligence analysts face today. There simply are not enough trained analysts to review the mass of collected information, analyze it, synthesize it, and develop it to provide situational awareness to decision makers. The potential use of artificial intelligence to streamline this process is significant. Computers using advanced algorithms can sort through tremendous volumes of data rapidly, highlighting patterns and anomalies that trained intelligence analysts can further scrutinize. This allows analysts to focus more of their time synthesizing relevant data by applying their expertise and knowledge of the mission to build situational understanding.

Imagery analysis provides a good example of how artificial intelligence can streamline analysis. An imagery analyst would spend countless hours watching video footage or reviewing thousands of images looking for particular objects. A computer, programmed to identify the same object, could perform this task in seconds, freeing the human analyst to perform tasks that require more critical thought. In other words, leveraging artificial intelligence allows analysts to perform more in-depth analysis and save time on sorting the data itself. Suppose, for example, a commander wanted to know if an adversary intended to deploy his long-range fires assets and if he intended to conduct an attack. The analyst knows what the adversary's vehicles look like but does not know where they are located, where the adversary will deploy them, or when he will move them. To answer the

commander's requirement, the analyst would spend countless hours reviewing imagery looking for the adversary's vehicles. However, an artificial intelligence-enabled computer could monitor numerous video feeds in real time and alert the analyst when the vehicles are identified. The analyst could then apply critical thinking and experience to discern if the vehicles are moving to a position to conduct an attack or are withdrawing from the battlespace.

The U.S. Air Force is going a step further, developing machine learning to assist its analysts. It is incorporating a tool called Artificial Intelligence Discovery and Exploitation, also known as AIDE, into its version of the Distributed Common Ground System. The system sorts through "oceans of data" seeking information it deems most relevant to its user.[12] It determines what information is most relevant from factors such as the user's search history and requests for information. Daniel Goddard, Director of the Information Directorate at the Air Force Research Laboratory, stated, "We believe advances in computational intelligence will help shift the burden of search, annotation and aggregation and analysis from airmen to artificial intelligence. AIDE reduces the time to discover potentially relevant information in air, space and cyberspace for the analyst, freeing up time for them to do what they do best—analysis."[13] To illustrate his point, Goddard notes that every day about 3.6 exabytes of new information are created globally. In one minute on the internet, YouTube receives a few hundred hours of video and people post about 450,000 new tweets. In that same time, the Air Force exploits, processes, and analyzes thousands of gigabytes of data according to Goddard.[14]

Biases in Artificial Intelligence

It is important to note that although the potential of artificial intelligence is tremendous, it does have limitations. Just as the potential for biases exists with human analysts, so it exists in artificial intelligence. MAJ Lee Hayward, an Intelligence Corps officer in the Australian Army, notes that "[artificial intelligence] AI systems are only as good as the input data, and outcomes can be corrupted by 'bad data' that contains implicit…biases."[15]

Many people mistakenly believe that artificial intelligence is objective and rational because a machine makes the decisions. The reality is that a machine performs artificial intelligence using the algorithms in its programming. People program those algorithms. Therefore, the potential exists for the programmer to pass his biases on to the machine through the programming code, thereby influencing how the computer considers and evaluates the data.

Likewise, machine learning is a process that inherently can be flawed because of the biases of the original programmer or the user. In machine learning, the computer "learns" based on the behaviors of the user, considering such things as search history and what the user does with the data. The computer uses these things to "predict" what the user will desire in the future and to return results it thinks the user would require. Thus, it is easy to see how the computer's "prediction" could be skewed given that it is based on a human user's interaction with the system, rather than on objective or rational criteria.

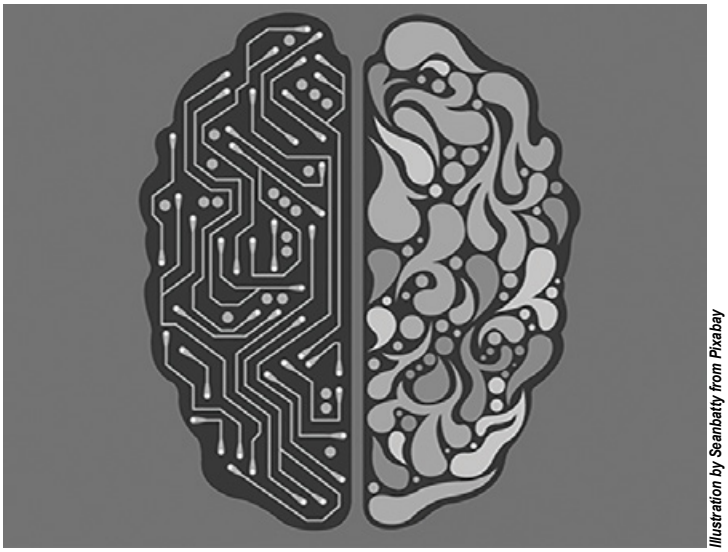

Illustration by Seanbatty from Pixabay

Algorithmic antibias training is harder than it seems. However, according to Olga Russakovsky, assistant professor at Princeton, "Debiasing humans is harder than debiasing [artificial intelligence] AI systems."[16]

It makes sense that biases in artificial intelligence could be mitigated through the careful application of critical thought and objective reasoning during the programming process. However, military end users of automation systems are not involved in the development process of their systems and often do not interact with those involved in programming the software. Therefore, end users are unaware of the original programmers' biases, making mitigation difficult. As MAJ Hayward states, "there is an opacity in machine learning, making it difficult to identify which features of the data-input the machine used to make a particular decision, and therefore where in the code the bias existed."[17]

Intuition versus Artificial Intelligence

As noted earlier, advanced analytics and artificial intelligence are widely used across Major League Baseball. However, many baseball managers still make decisions from a "gut feeling" in certain situations. For example, in the ninth inning of a playoff game in 2012, New York Yankees manager Joe Girardi decided to bench his star third baseman Alex Rodriguez, one of baseball's greatest hitters. He replaced him with aging pinch-hitter Raúl Ibañez. Ibañez hit a home run in that inning and another in the twelfth inning to win the game. When asked later about his decision,

Girardi said, "I just had a gut feeling."[18] David Bell, manager of the Cincinnati Reds, plans his lineups several days in advance, primarily relying on data analyzed by a computer that "predicts" the best matchups versus his opponents. However, occasionally he will alter the lineups because of his intuition, stating, "There's nothing wrong with that, taking a chance, and mixing things up. Over the course of a long period of time, it is great to have the numbers and that objective information as more of a guide."[19]

Carl von Clausewitz, in his seminal publication *On War*, acknowledged the importance of the commander's intuition, something he called *coup d'oeil* (this French term literally means "stroke of [the] eye"). He based his analysis of the importance of coup d'oeil on Napoleon's keen sense for identifying opportunities to win battles.[20] Professor William Duggan, Associate Professor of Management at Columbia Business School, notes that research on expert intuition supports the notion that in urgent situations people make decisions by combining analysis of past experience with a flash of insight.[21] In his book *Coup d'Oeil: Strategic Intuition in Army Planning*, Duggan asserts that Army doctrine reflects an outdated view of the human mind—the idea that analysis and intuition take place in separate parts of the brain and are appropriate for different situations.[22] He goes on to argue that new brain research shows analysis and intuition are closely intertwined in all situations.[23]

The Commander's Coup d'Oeil

When all is said and done, it really is the commander's *coup d'oeil,* his ability to see things simply, to identify the whole business of war completely with himself, that is the essence of good generalship. Only if the mind works in this comprehensive fashion can it achieve the freedom it needs to dominate events and not be dominated by them.

—Carl von Clausewitz
On War[24]

The examples from Major League Baseball show us that when managers fully embrace artificial intelligence in decision making, they understand it is only a tool. Successfully managing a baseball team involves art and science. Intelligence analysis is both an art and a science as well. The algorithms behind artificial intelligence, the machine-learning process, and even the critical-thinking tools that a human analyst uses are the science of intelligence analysis. They are rules-based and are applied to given situations. Conversely, making sense of the data, predicting the adversary's actions, and communicating the information to the commander is the art of intelligence analysis, because it requires an analyst to combine the collected data with experience and intuition. This process varies among different analysts and is situationally dependent. It is not based on definitive rules. Hence, this is the art of conducting intelligence analysis.

Conclusion

Artificial intelligence alone will not win wars. War will remain a human endeavor. And though the nature of war will not change—with nations using applied violence to achieve a political end—the character of war will continue to evolve. The speed at which commanders make decisions has been a determining factor in victory for centuries. Artificial intelligence has the potential to revolutionize the military decision-making process, enabling commanders to act faster than their adversaries. Baseball managers rely on advanced analytics and artificial intelligence to inform their decisions while still applying their experience and intuition in certain situations; military commanders must do the same.

Artificial intelligence has tremendous potential to improve decision making, but we should view it as a complementary tool, not a substitute for experience and intuition. Dr. Aaron Bazin, U.S. Army officer and author of the book *Think: Tools to Build Your Mind,* emphasizes this point, noting that combing artificial intelligence and the human brain, rather than using them as separate elements, could result in better decision making. A military force that quickly takes this approach and combines it with cognitive computing could gain a decisive advantage on the battlefield.[25]

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Photo by SSG Alexander Henninger

United States Army Paratroopers assigned to the 173rd Airborne Brigade plan during Swift Response 17 in Hohenfels, Germany. Swift Response is an annual U.S. Army Europe-led exercise focused on allied airborne forces' ability to quickly and effectively respond to crisis situations as an interoperable multinational team.

Analytical Street Smarts:
What They Didn't Teach You in School

by Lieutenant Colonel James Reed (Retired), Captain Andrew Howerton, and Captain Phillip Johnson

Introduction

The purpose of this article is to share skills for leading intelligence analysis efforts, skills that come from the school of hard knocks and multiple overseas deployments. Army schools focus on teaching doctrinal techniques for conducting intelligence analysis, but through real-world experience military intelligence (MI) leaders gain the street smarts (the common sense and skills) necessary to operate successfully in any environment. These analytical street smarts are critical skills for MI leaders who supervise analysis activities within their units, including corps and division G-2s, brigade and battalion S-2s, and analysis and control element (ACE) chiefs.

Before discussing analytical street smarts, we must first define the term *intelligence analysis*. The Army's principal publication on the subject is ATP 2-33.4, *Intelligence Analysis.* A new version was published in January 2020. Rather than define the subject too narrowly, this publication does a good job cataloging all things related to intelligence analysis. It presents a myriad of related processes, concepts, skills, and techniques, and ultimately defines intelligence analysis as a four-step process (*Screen, Analyze,* and *Integrate* information using reasoning and analytical techniques in order to *Produce* intelligence) that is conducted primarily to answer a commander's priority intelligence requirements. These four steps also support other

staff processes, such as the military decision-making process and collection management, which all lead to the commander's situational understanding.[1] Knowledge of the following concepts (or street-smart skills) will enable personnel to lead analytical efforts within their units.

The Phases of the Intelligence Analysis Process

The phases of the intelligence analysis process are interdependent. Through time and experience, analysts become more aware of this interdependence. The phases of the intelligence analysis process are—

- Screen (collected information): Determining the relevance of the information collected.
- Analyze: Examining relevant information.
- Integrate: Combining new information with current intelligence holdings to begin the effort of developing a conclusion or assessment.
- Produce: Making a determination or assessment that can be disseminated to consumers.

Note. *Relevant information* is all information of importance to the commander and staff in the exercise of command and control.

—ATP 2-33.4, *Intelligence Analysis*[2]

Unit Training versus Institutional Education

There is a big difference between teaching and training. Army schools teach Soldiers individual skills, but the actual training of collective skills occurs at the unit. Unit leaders need to develop standard operating procedures for how they intend to conduct intelligence analysis within their operations and training. Even though new Soldiers learn numerous analytical techniques while at Army schools, they must still receive training on the unit's specific procedures and expectations. An example frequently seen in units is Soldiers who can develop a link diagram of an insurgent threat group but rarely go to the next level of analysis, which is to use the information from the link diagram to develop an order of battle (line and block chart) that depicts the actual structure of the threat group. The unit level training shows Soldiers how to apply the analytical techniques they learned in Army schools to products they develop for commanders and staffs. Teaching takes place in school, but Soldiers still require training once they arrive at the unit.

Analyst training and certification must be at the unit level. Good leaders train their personnel on analytical techniques. For instance, upon their arrival, Soldiers assigned to a corps ACE should read all standard operating procedures and then receive training on the specific analytical techniques used within the ACE. This normally requires implementation of some form of certification program within the unit with a noncommissioned officer, warrant officer, or officer assigned the additional duty of running the program. The goal of the program should be to build Soldier skills and confidence with the analytical techniques used by the organization. For example, a Soldier may have learned in school how to write a short one-paragraph assessment after receiving an intelligence report. Upon assignment to the corps ACE, the Soldier must research and write multipage assessments on various topics. The Soldier will need training on how to research and write these lengthy assessments before doing so on their own. A good certification program should also include familiarity with the unit's area of operations (AO) and the unit's target set.

Details and Homework Matter

Analysts must be willing to dig into the tiny details. Analysis is "the process of breaking down a complex topic [or problem] into smaller parts in order to gain a better understanding of it."[3] Following this, one must also be able to reconstruct those parts to discover what you have. Detailed knowledge about an adversary and its capabilities, and about how to exploit or mitigate them, is often the key element that drives mission success. Toward this end, sometimes a good level of fidelity (extremely detailed analysis) is required for the G-2/S-2 section to be of greatest value. Our military history has shown us the benefits of this approach. For example, during the Persian Gulf War, the G-2/S-2 section provided critical information about how the Iraqi T-72 tank's autoloader functioned, giving the M1A1 tank gunners the split-second advantage over T-72s during the Battle of 73 Easting. The intelligence sections did this by breaking down the information into smaller parts and then explaining the autoloader's step-by-step process and timing. In World War II, it was the detailed understanding of the time it would take the Japanese fleet to arm and launch aircraft that gave ADM Chester Nimitz the confidence to attack during the Battle of Midway. And it is the detailed breakdown of how enemy fighter pilots operate that gives American pilots of today the momentary advantage in their first engagement. At times, analysts must understand, and be able to explain, the nuanced advantages and disadvantages of enemy capabilities. They must also understand how to mitigate or exploit enemy capabilities through friendly force capabilities in order to best support the warfighter.

Often, we *think* we have dug into the details. An example of conducting detailed analysis by dividing a complex topic into smaller parts involves an S-2 section of an air defense artillery battalion. In order to understand the threat posed by enemy ballistic missiles, the S-2 section might begin by diving into the enemy's ranges, locations, and types of ballistic missiles. Yet this only provides composition and

Photo courtesy of the National Archives

United States military personnel gather near a demolished Iraqi T-72 main battle tank, destroyed by allied forces during the Gulf War, March 3, 1991. M-2 Bradley vehicles are parked near the tank.

disposition. Some might conduct further analysis, assessing how the enemy would employ its ballistic missiles. However, this only provides potential enemy courses of action. Yet a deeper level of analysis can still be done by identifying the step-by-step firing sequence for the missile, in-flight control mechanisms, time-distance analysis, and likely trajectories. With this more detailed analysis, air defenders can understand how much time (how many minutes) they have to make their decision (react). In this case, the S-2 section briefs personnel from the air defense artillery battalion that in a typical engagement they will have 12 seconds at most in which to decide whether to fire. Failure to do this detailed analysis may result in the air defense artillery unit being caught unprepared in their attempts to defeat enemy ballistic missile attacks.

Analysis requires you to constantly do your homework. In an Army filled with competing priorities, how do intelligence professionals remain proficient in their craft of intelligence analysis? They put in the effort and do the work. Professionals realize they must spend hours of their own time reading and staying attuned to current events. Study doctrine and constantly challenge your thinking by reading about foreign armies and cultures. Our ability to influence and enable our commanders comes primarily from our ability to analyze the operational environment. In order to do so, one must have a working knowledge of current and historical events, threat doctrine, and military capabilities. Intelligence analysts must be constantly reading and familiarizing themselves with anything that pertains to their AO or area of focus. Bottom line: Show up and put in the work.

Communicating with the Commander

You must be able to brief your analysis. As MI leaders, we can have the best analysis and assessments in the world, but if we fail to effectively articulate our products, all our efforts will go to waste. An analyst must both produce intelligence products and be able to brief them to the commander and staff. It helps if you know how to speak your commander's language, a skill that comes from knowing your commander's background and how he or she likes to receive information. If you do not have an understanding of how your commander likes to receive information, ask. It is that simple. Rehearsals are also key, so rehearse before every briefing you give. If possible, rehearse in front of your section or peers. Have your audience hit you with criticism, and be willing to accept and implement their feedback. Through these methods, you can strengthen your ability to communicate your analysis to your commander.

Your commander's priorities are your priorities. Analysts must stay oriented on their commander's priorities. It is our duty as intelligence professionals to know our commander's priorities to ensure we are best enabling them to make informed decisions. As intelligence professionals, we accomplish this through the commander's priority intelligence requirements—he needs to know these things to accomplish his vision and objectives. However, it goes much deeper than that. As intelligence professionals, we should also understand the "blue" picture—what our unit is trying to accomplish. Understanding what we are doing as a unit will help you know the key pieces of intelligence you need in order to enable your commander and unit to

Photo by LTC James Reed (retired)

Military Intelligence Captains Career Course students discuss their analytical assessment prior to the daily brigade operations and intelligence briefing, January 2020.

accomplish the mission. Do not be the stereotypical MI leader who disassociates themselves from the rest of the staff. Get involved in the planning process in order to develop this understanding. Always try to understand what effect the commander is trying to achieve, whether in the initial planning process or the operation's final execution phase. It is easy to be caught up in the many daily requirements and lose track of what is most important (lose the analytical bubble). Concentrate analytical efforts on the commander's priorities in order to help the commander achieve their objectives. Not only will this help focus your analysis, but it will also build your rapport with your commander.

Integrate the Information and Write the Assessment

"Analytical criteria" can be established to streamline the process. Step three of the four-step intelligence analysis process in ATP 2-33.4 is *Integrate*. It is "combining new information with current intelligence holdings to begin the effort of developing a conclusion or assessment."[4] This is one of the most important steps in conducting analysis. Normally, after receiving one or more intelligence reports on a topic, an analyst will attempt to write an assessment that explains the meaning or significance of the information. To do this, they will compare the new intelligence reports to current holdings (digital files in searchable databases) and ask themselves, How does what I know about the enemy or situation change with the information I just learned? This process applies at any level (tactical through strategic). However, searching through many digital files can be cumbersome. To simplify the process, leaders can create what we will call, for lack of a better term, "analytical criteria." These analytical criteria are simply a list of questions written for the analyst to use as a filter. The filtering of the new information through these analytical criteria assists analysts with forming and writing their assessment and streamlines how they conduct the analysis. When units do not have a list of analytical criteria, analysts are tempted to save time by not searching current holdings and instead simply do the process in their own mind based on their memory, which often leads to poor analysis.

Developing a list of analytical criteria is easy. As an example, in a wide area security situation such as Afghanistan, if the division ACE receives an intelligence report that a new type of under-vehicle improvised explosive device (UVIED) is in use on the battlefield against unidentified civilian targets, analysts can use the unit's written analytical criteria to lead them through the process of writing their assessment. The analytical criteria could include—

- Which threat group is most likely related to this incident: the Al Iksir Cartel, the Bilasuvar Freedom Brigade (BFB), or the Bocyowics Crime Family?
- Which threat groups have conducted similar types of attacks?
- Where have similar types of attacks taken place?
- How have civilians been targeted previously?

Given these four analytical criteria (four questions), the analyst is now able to easily and quickly write an assessment that might look like this: "This new UVIED is most likely being used by the BFB because this group has extensive experience with IEDs. Previous attacks against civilians have included roadside IEDs against commercial trucks operating in Atropia. The BFB is likely using this new UVIED as a more efficient way to target commercial trucking companies unwilling to pay extortion money."

Analysis must also be predictive. When writing an assessment, the analyst must end it with some form of predictive statement (prediction) concerning future events. The first part of the assessment should explain what happened and what the enemy looks like, or how they operated. It should then be predictive and tell what happens next. For instance, let us imagine your S-2 section receives a report from 1st Battalion that enemy drones were observed above their position. Given this report, your analyst could write a quick assessment, stating the likelihood of it being an Orlan-10 drone, describing the main capabilities of the Orlan-10, and indicating its role as a spotter aircraft for enemy indirect fire units. Then the analysts could finish with the following predictive statement: "Units observing an Orlan-10 overhead can expect an enemy indirect fire attack within 20 to 30 minutes." Assessments should always have a predictive component to them.

Writing styles and content of analysis changes at echelon. The focus of daily analytical products and assessments will

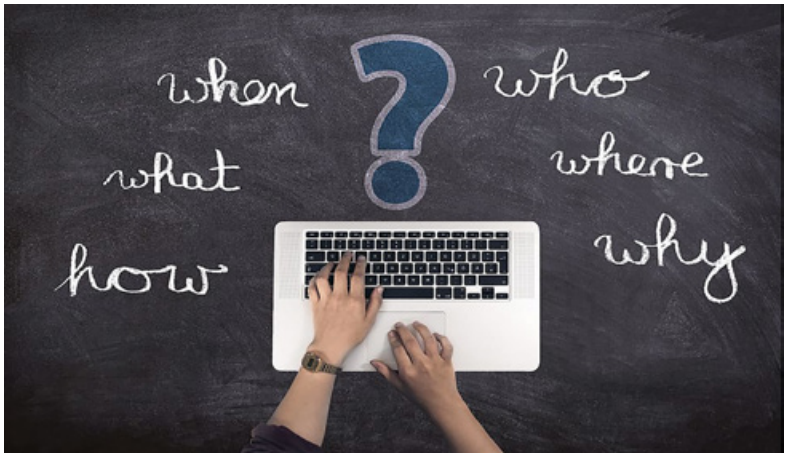

Photo courtesy of Pigsels

Analysts must be willing to question and challenge their thinking.

be different depending on whether your unit is conducting tactical, operational, or strategic level analysis.

- *Tactical intelligence* is typically of direct importance to your unit's AO. Threat forces may include enemy forces in or near your AO, such as local criminal threats, gangs operating in the AO, etc. This is like operating at the county level.
- *Operational intelligence* is the analysis level in which joint or combined actions and/or larger units have an effect. The movement of battalions and brigades is of intelligence value at this level. This is like operating at a state or regional level.
- *Strategic intelligence* usually focuses on a national or global level. It typically involves military and political objectives, and it may even deal with U.S. national security or foreign policy. It can also include cyberspace attacks, nuclear weapons, and/or financial or economic warfare.

Teamwork and Mentorship

Analysis often requires all intelligence disciplines to work together. Analyzing a complex problem often requires personnel from all intelligence disciplines (human intelligence [HUMINT], signals intelligence [SIGINT], geospatial intelligence, etc.) working together to analyze the problem independently and then coming together to present their analysis. This process relies on intelligence professionals from each intelligence discipline doing their job analytically. This means they cannot just do collection; they must also do analysis of the information collected. For instance, the HUMINT cell must produce a daily HUMINT summary (HUMSUM), and the SIGINT cell must produce a daily SIGINT summary (SIGSUM). The HUMSUM is not a one-to-end of all reporting in the past 24 hours but rather an initial cut separating the wheat from the chaff by the HUMINTers so that all analytical work is not on the shoulders of the all-source cell. The same applies to the SIGSUM. Complex problems, such as trying to locate an enemy operating in your AO that does not want to be located, can be solved, but only when each intelligence discipline contributes to the analytical effort and supports all-source analysis.

To develop your analysts, there is no replacement for mentorship. Soldiers put into analyst positions often have a difficult time learning how to write useful assessments. Many analysts are on night shift or swing shift, especially at higher echelons, which can result in unit leaders overlooking them. Many produce poorly written assessments, only to have day-shift personnel tasked with rewriting the assessments before they are good enough for publication. Mentorship is what these analysts need. Find a way to schedule time for regular mentorship of the analysts. One way to accomplish this is to assign someone the responsibility of going to the office early in the morning (in their Army physical fitness uniform) to spend time reviewing assessments and discussing with analysts better ways to write them. The mentor should then go to morning unit formation. Another way is for the mentor to go to the office late at night twice a week to help improve the writing styles of the night-shift analysts. If you want your analysts to write useful assessments, you must provide them good mentorship. This type of mentorship is also of value to analysts in temporary assignments as non-analysts, so consider including them as well.

Conclusion

This article shared a few analytical street smarts for those who lead analytical efforts in their units. MI leaders employing these concepts will be successful in any operational environment. Take these important ideas and add to them as you progress in your career and Army profession.

Endnotes

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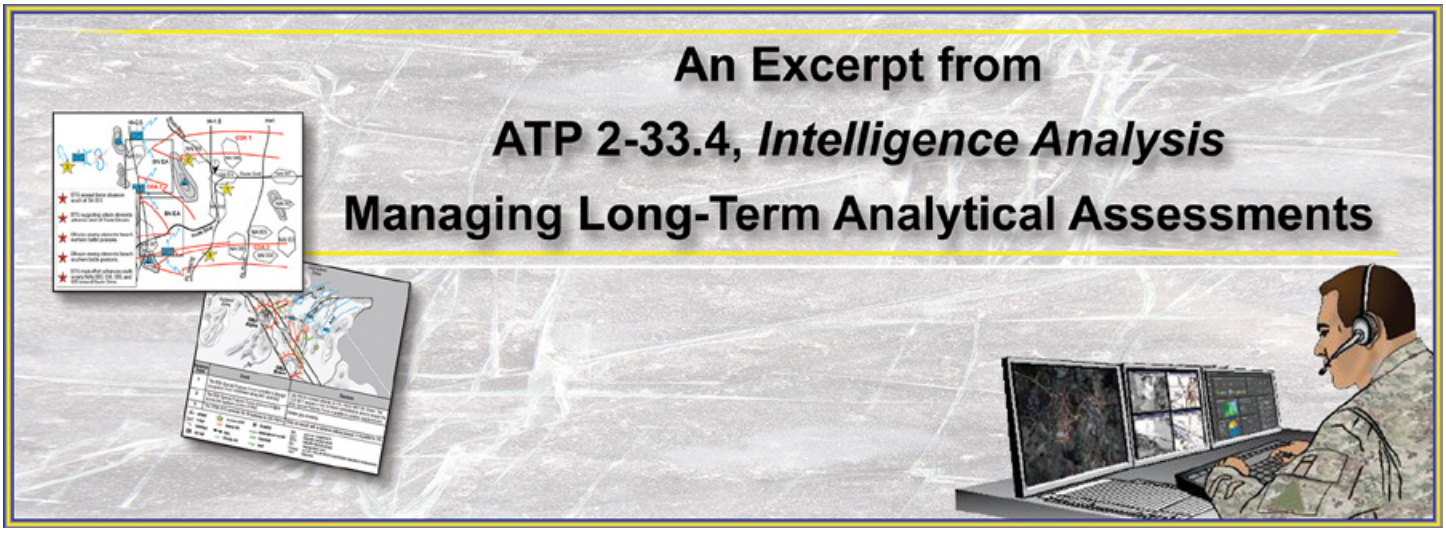


Editor's Note: The following text is from Chapter 9 of ATP 2-33.4,* Intelligence Analysis, *10 January 2020.

Overview

Any echelon can conduct long-term intelligence analysis, which is simply analysis over a longer period of time (several months or longer). There are many forms of long-term analysis, such as long-term analytical assessments. Formal (authoritative or exploratory) long-term analytical assessments are usually associated with operational- and strategic-level intelligence units and organizations because these assessments are resource-intensive. Intelligence analysts at the tactical level can use some of the steps and substeps discussed in this chapter in order to improve their analysis, but they rarely apply all of the steps of the process.

Managing long-term analytical assessments, also referred to as analytic design in this chapter, ensures the analytical effort results in the best possible assessment. Analytic design ensures the analytical effort is properly focused, carefully planned and executed, and that the analytical results are effectively communicated to the requestor. The Defense Intelligence Agency published a helpful document, *Analytic Design: Analytic Tradecraft Guidance from the DI Research Director,* which served as the basis for this chapter.

Long-term analytical assessments are produced using a deliberate and specific execution of the intelligence analysis process over a longer period of time that closely complies with the Intelligence Community Analytic Standards (to include the analytic tradecraft standards) established in [Intelligence Community Directive] ICD 203. This form of analysis includes the careful management of the overall effort, dedicating significant resources to the effort (for example, analysis is conducted by an analytic team), executing various iterations of analysis, and applying advanced structured analytic techniques within the effort.

> ***Note.*** Intelligence personnel should not use this chapter to develop criteria and standards for tactical-level intelligence analysis. This chapter covers the basics of analytic design but does not cover all the information needed to develop formal long-term analytical assessments. Specifically, some of the analytic techniques and the use of models and automated simulations are not discussed in this publication.

The Basics of Analytic Design

Managing long-term analytical assessments is accomplished by performing seven analytic design steps, as shown in figure 9-1 (on the next page):

- **Step 1:** Frame the question/issue.
- **Step 2:** Review and assess knowledge.
- **Step 3:** Review resources.
- **Step 4:** Select the analytic approach/methodology and plan project.
- **Step 5:** Develop knowledge.
- **Step 6:** Perform analysis.
- **Step 7:** Evaluate analysis.

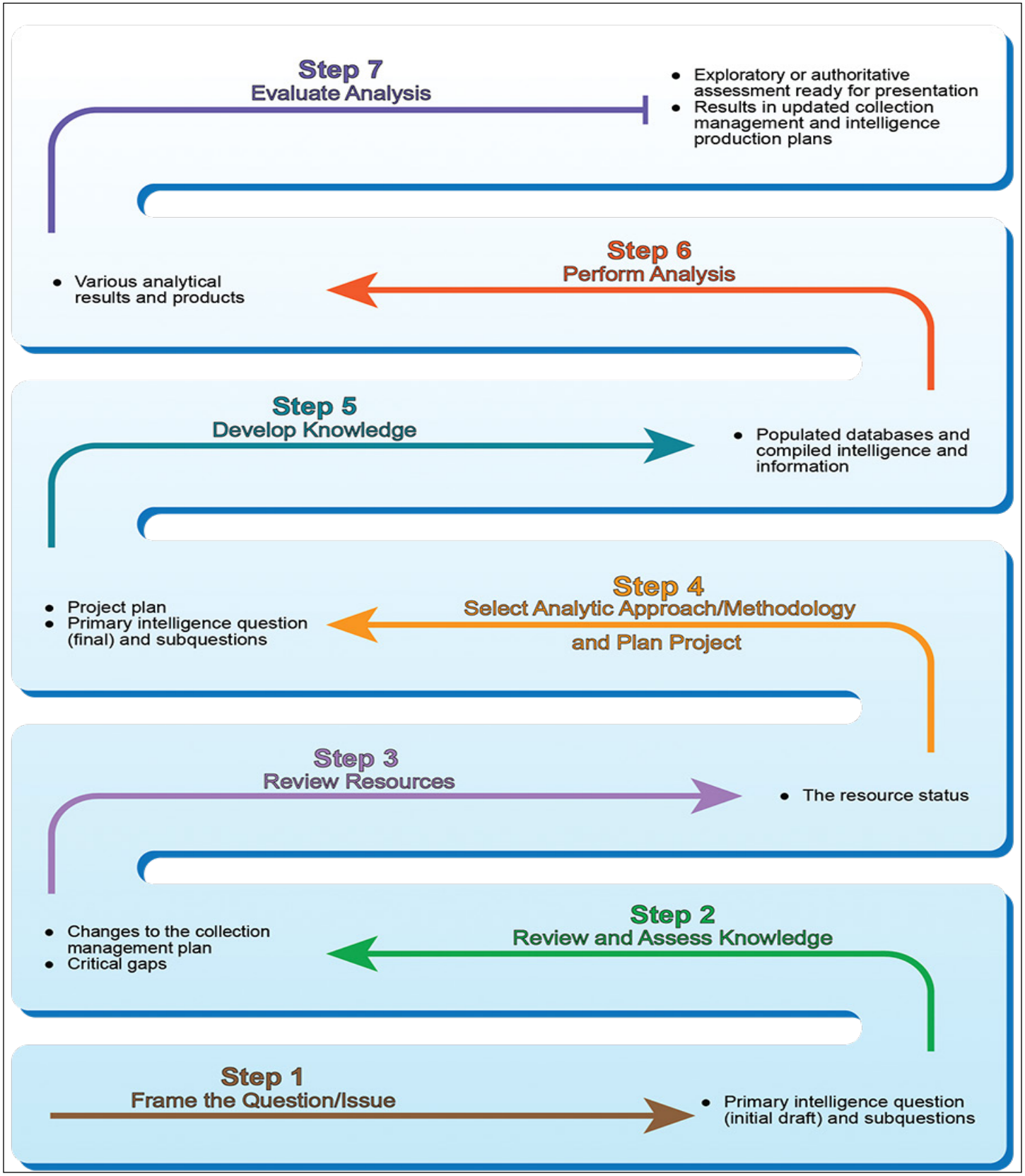


Figure 9-1. Analytic Design Steps

Frame the Question/Issue

Properly framing the question greatly increases the chance of successful long-term analysis. The analytic team starts with understanding the requestor's requirement by identifying relevant topics and issues that break down into a primary question that can be analyzed. Framing the question includes refining and scoping the question to carefully capture the requestor's expectations, mitigate bias, craft an objective analytic question, and develop subquestions. This step results in an initial draft of the primary intelligence question and is followed by reviewing and assessing existing knowledge. (See figure 9-2.)

Note. Do not confuse the frame the question/issue step with the "frame" activities associated with the Army design methodology. (For information on the Army design methodology, see ATP 5-0.1.)

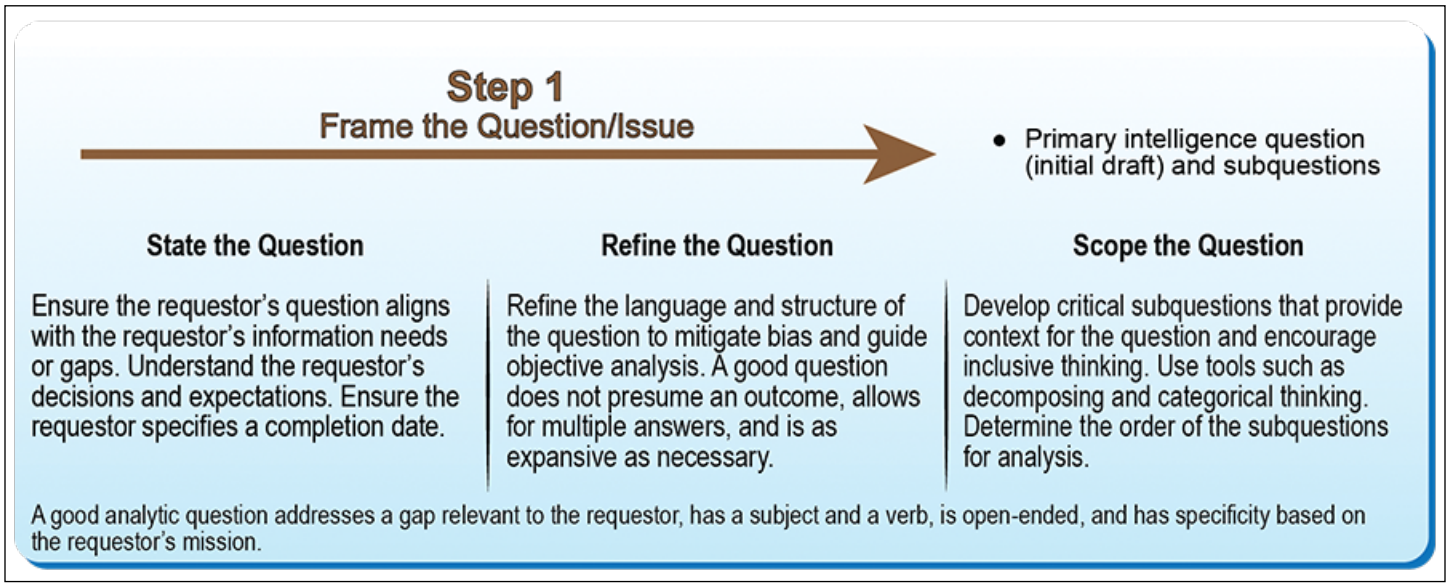


Figure 9-2. Frame the Question/Issue

Review and Assess Knowledge

Reviewing and assessing knowledge involves an overlap of the analytical effort with collection management. Step 2 includes reviewing available information and intelligence, the collection management plan, and results of ongoing intelligence collection, as well as identifying information gaps. (See figure 9-3.)

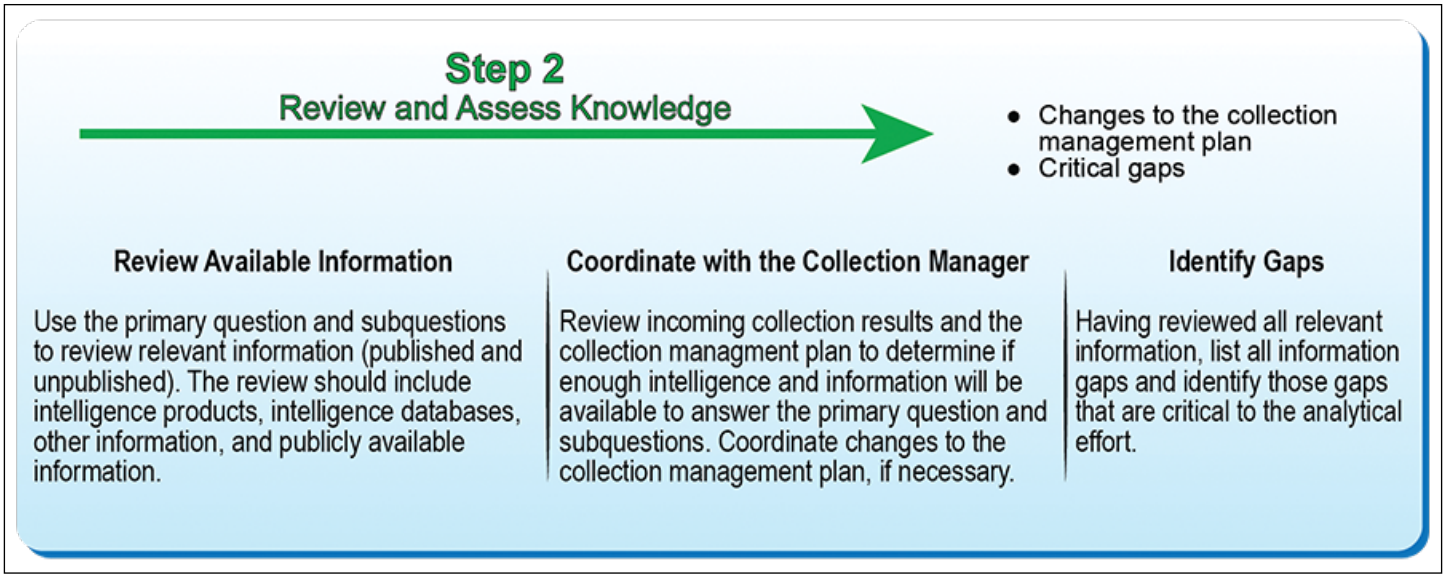


Figure 9-3. Review and Assess Knowledge

Review Resources

After understanding what knowledge is available and identifying information gaps, the next step is reviewing available resources, such as tools, personnel, and time. (See figure 9-4.)

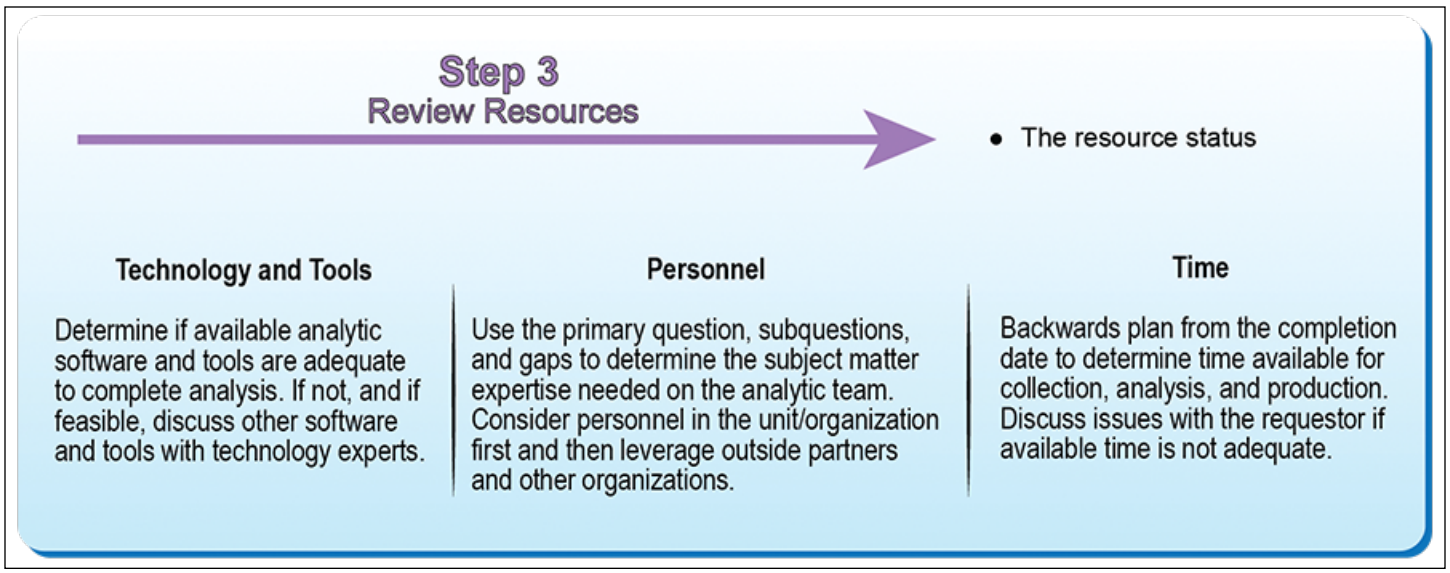


Figure 9-4. Review Resources

Select the Analytic Approach/Methodology and Plan Project

Using the results of steps 1 through 3, the analytic team finalizes the primary intelligence question and subquestions, selects the analytic approach/methodology, and develops a project plan. The analytic approach/methodology includes the specific analytic techniques, who will perform each technique, and the sequence of those techniques to ensure analytic insight and mitigate bias. (See figure 9-5.)

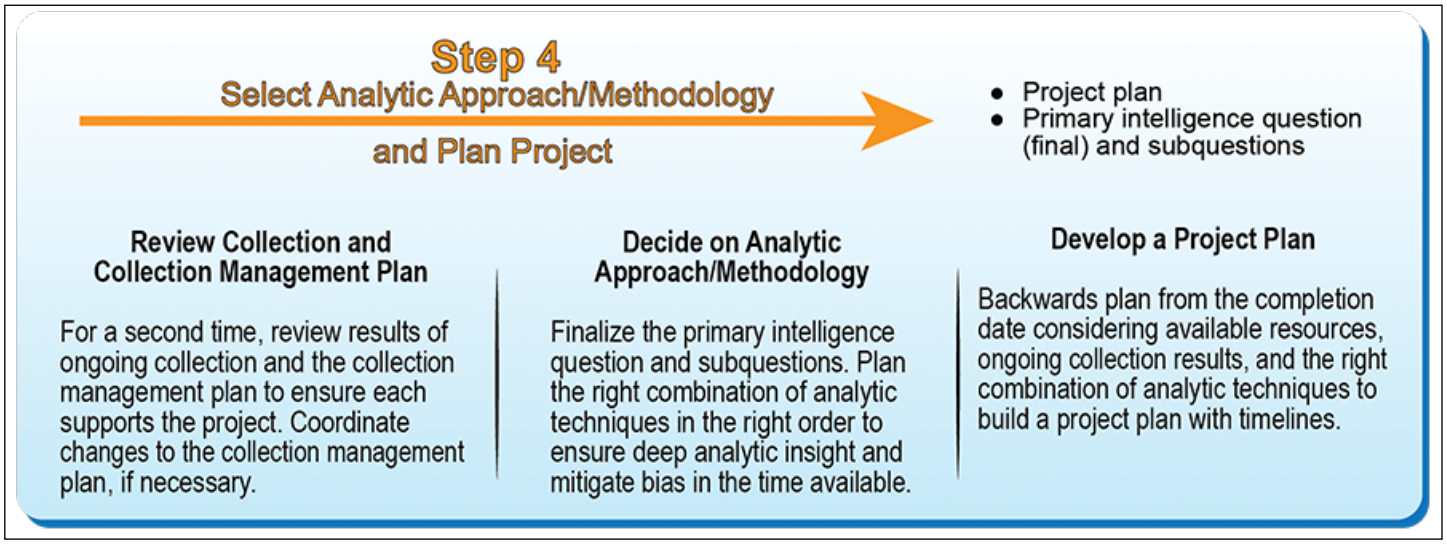


Figure 9-5. Select the Analytic Approach/Methodology and Plan Project

Develop Knowledge

Developing knowledge is the last step before performing analysis. Although discussed as a separate step in the process, developing knowledge occurs continually throughout the process. The analytic team gathers all relevant intelligence and information through ongoing collection, intelligence reach, and internal research. (See figure 9-6.)

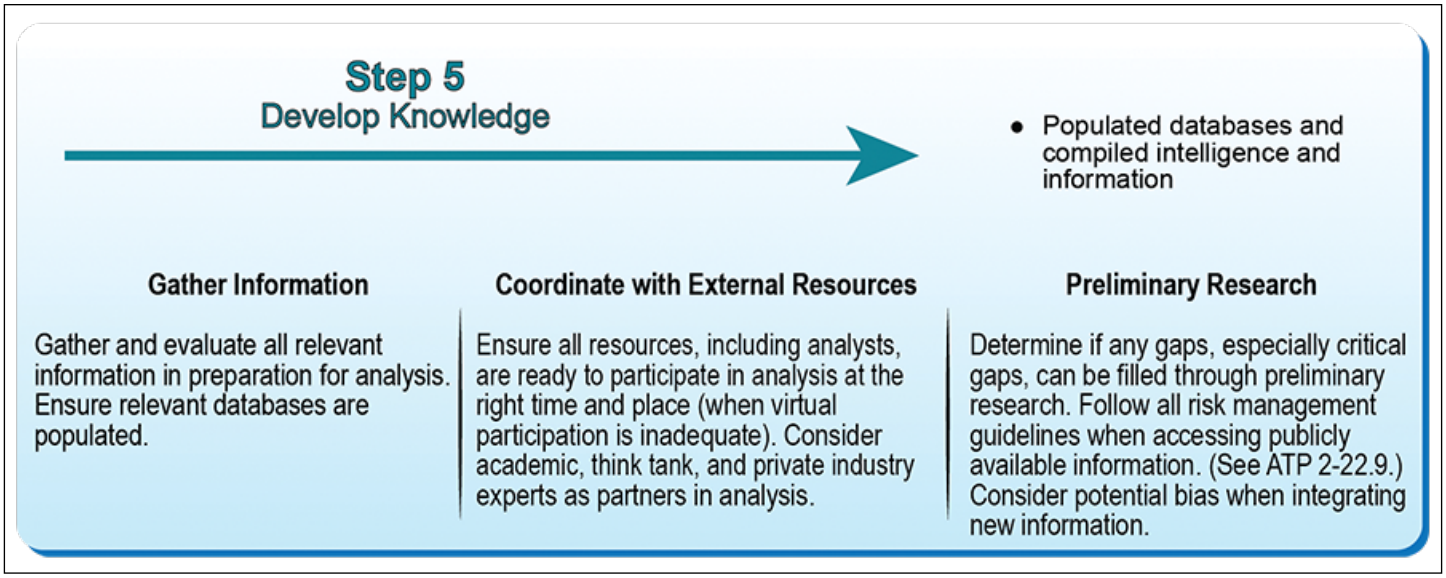


Figure 9-6. Develop Knowledge

Perform Analysis

Steps 1 through 5 set the stage for the deliberate execution of analytic techniques, to include adjusting the project plan, if necessary, and assessing the analytical results using the context that was developed while framing the question/issue. (See figure 9-7.)

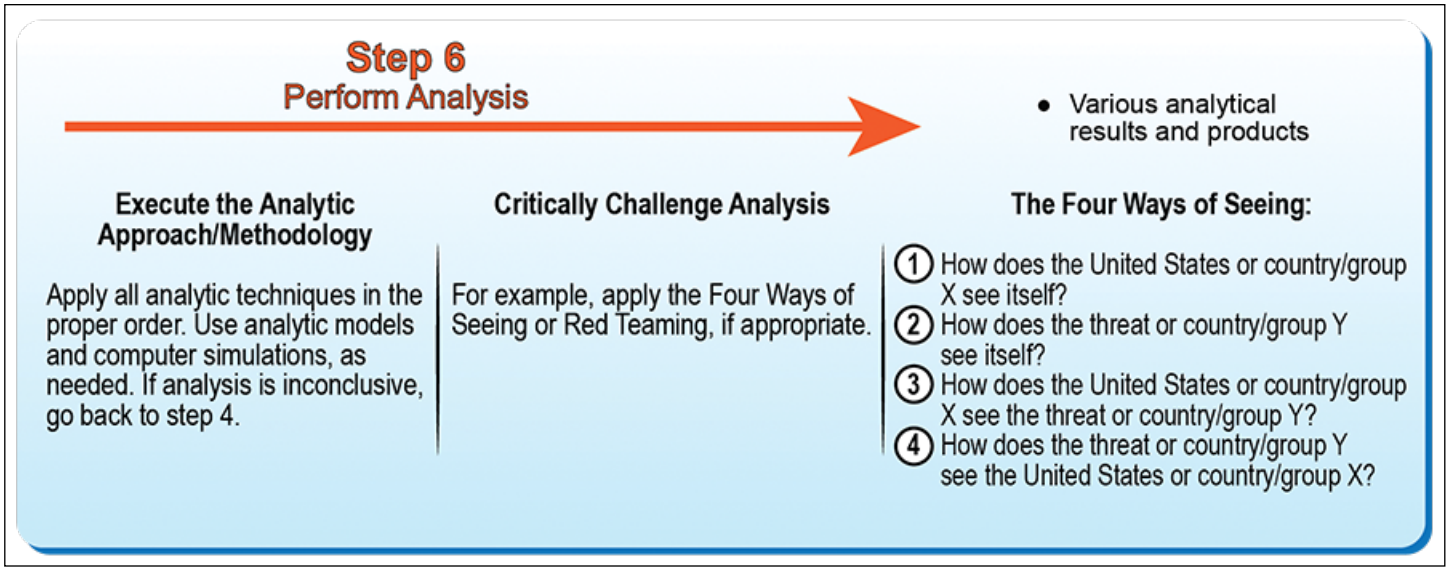


Figure 9-7. Perform Analysis

Evaluate Analysis

Evaluating analysis, the final step of the process, results in the final analytical results and associated information necessary to make a presentation to the requestor. Evaluating analysis includes assessing the analytical results and the impact of analytic gaps and unconfirmed assumptions, performing analysis of alternatives, and assigning a confidence level to the analytic answer. (See figure 9-8.)

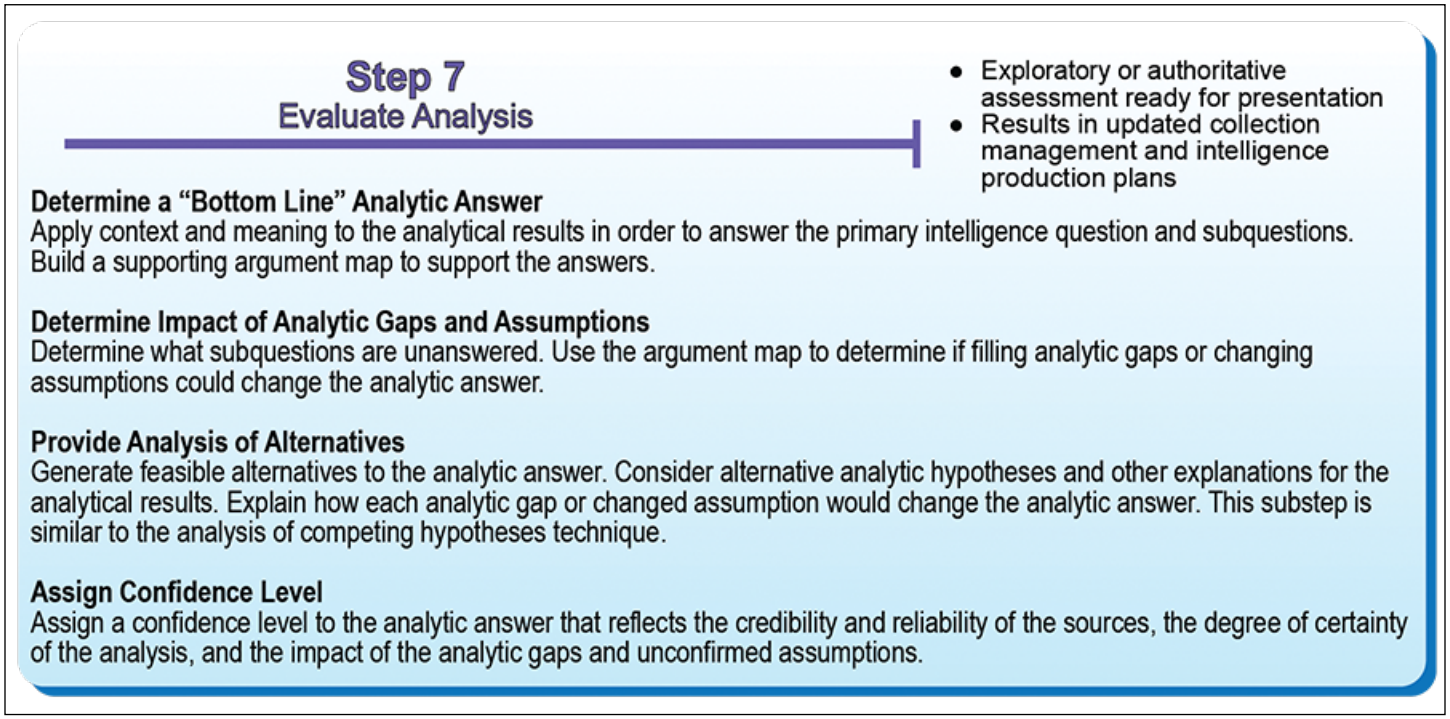


Figure 9-8. Evaluate Analysis

Collaboration During Analytic Design

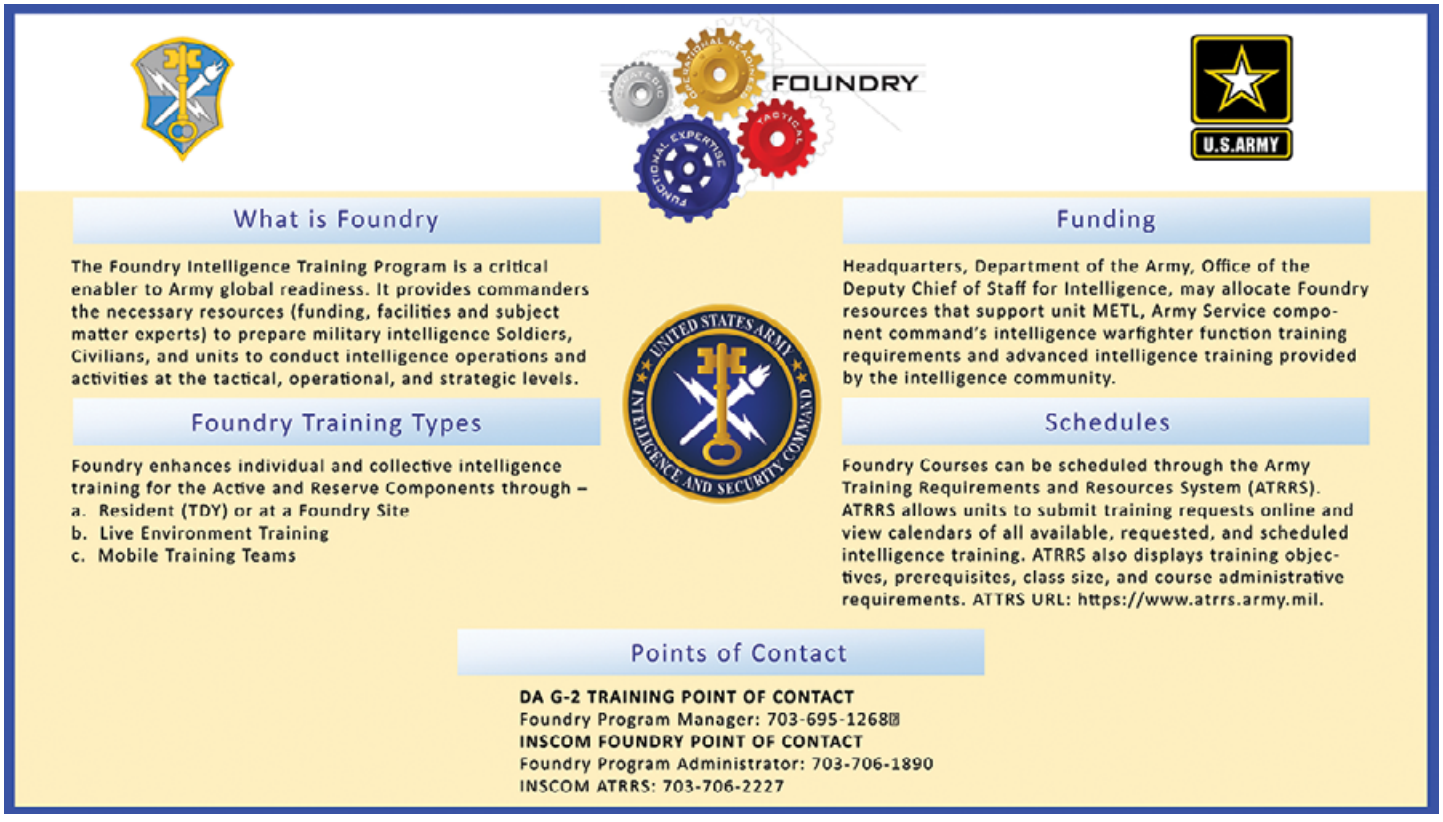
Collaboration is critical to long-term analytical assessments and occurs between different stakeholders across the intelligence community. This collaboration ensures a diversity of perspective and depth in expertise that is impossible through any other means. Four specific areas in which collaboration is invaluable are—

- **Bias mitigation:** Analytic teams with diverse backgrounds and different perspectives can effectively identify and check assumptions, interpret new information, and determine the quality of various types of information.
- **Framing/Knowledge review:** Analytic teams can engage early in the process to build context, craft analytic questions, share information sources, and develop analytical issues.
- **Methodology building:** Analytic teams assess the credibility of the analytic approach and clarity of the argument through various means, including peer reviews.
- **Perform analysis:** Analytic teams can perform various analytic techniques, identify hypotheses, and analyze alternatives as a group to improve the quality of the analytical effort.

Transitioning from the Analytic Design Process to Presenting the Results

Managing long-term analytical assessments includes not only presenting an analytic answer but also a confidence level to the answer and alternative hypotheses or explanations for gaps and uncertainty. During evaluate analysis, the last step of the process, the analytic team decides whether the question requires more analysis, and therefore, whether the assessment is exploratory or authoritative and ready to present to the requestor. If the results are ready for presentation, the analytic team deliberately prepares to present those results. Transitioning from long-term analysis to presenting the analytic answer includes stepping back from that analysis, reviewing the assessment, and clarifying the relevance of the analytical results. Then the analytic team determines—

- **What is the message:** The message characterizes whether the assessment is authoritative or exploratory and includes the "bottom line" of the assessment. Additionally, the assessment includes any shifts in analysis that occurred over time, any impacts on the requestor (decisions and future focus areas), the confidence level, alternative hypotheses, and indicators.
- **What is the analytical argument:** The analytic team develops an outline for logically progressing through the analytical assessment. An argument map is a useful tool to ensure a logical analytical flow during the presentation and to ensure the message is easily understood. The team may use basic interrogatives (*who, what, when, where, why,* and *how*) or a similar tool to capture the critical elements of the message to present to the requestor.
- **What are critical gaps and assumptions:** Gaps and assumptions identified during the evaluate analysis step become limitations to the certainty of the analytical assessment, and, in some cases, drive future analytical efforts. The analytic team may insert gaps and assumptions within the message and clearly discuss the level of impact on the assessment (for example, in the source summary statement or in the "bottom line" statement).
- **What reasonable analytical alternatives remain:** For authoritative assessments, answering the questions *"what if I am wrong"* and *"what could change my assessment"* provides analysis of alternatives that should be included in the assessment to explain what remains uncertain.
- **What product or products should be presented:** Determine the best format for the presentation that facilitates the discussion of the argument. If it is exploratory analysis, the format should allow the analytic team to effectively describe the new understanding of the topic and its relevance to the requestor. The team should consider the following when choosing the format: requestor preference, specific tasking/requirement, complexity of the argument, urgency/time constraints, and potential interest of others.



How to Make Sense of Battlefield Reports Using Analog Methods

by First Lieutenant Christopher K. Counihan

Introduction

A vast amount of information flows through a command post during large-scale ground combat operations, and intelligence staffs must use a systematic approach to process the information into intelligence. As the tempo of operations increases along with requirements for movement and maneuver, tactical units may find themselves dependent more on their own collection and analysis as communications can be constrained. Using a journal entry system and map overlays as a backup to the Distributed Common Ground System-Army will help capture and process all the available information, while allowing the intelligence staff to analyze patterns that will help predict threat actions and reduce operational uncertainty.

Problem

This article addresses the difficulty that a battalion or a squadron encounters when conducting situation development in large-scale ground combat operations. Intelligence officers and staff must collect all the information possible that pertains to the enemy and process this information into intelligence through analysis. However, the amount of information that a command post receives can be so great that the intelligence staff may quickly lose sight of the end state of information collection and analysis, or may not be able to account for all the information when making an assessment. Currently, only unit standard operating procedures (SOPs) exist to guide the staff through situation development, and these SOPs can differ greatly from unit to unit.

Photo by Air Force SrA Jonathan Padish

An Indiana National Guardsman reads a map during a reconnaissance and surveillance exercise at the Lešť military training center in Slovakia, November 1, 2019.

Solution: A System of Comprehensive Analysis

One solution to this problem is a system of comprehensive analysis. This system involves a collection of map overlays coupled with a journal entry system that captures all the information available through reports in a command post and displays the results in a color-coordinated manner for easy and quick analysis. These tools provide the intelligence officer and analyst a simple yet effective tool to determine and predict patterns indicative of threat actions. Analysis of these patterns could lead to windows of opportunity that enable the friendly force commander to exploit and develop a position of relative advantage. A thorough understanding of these patterns also provides the intelligence staff a quick reference—a visual aid to understand enemy actions in a chronological order that functions like a flipbook. Additionally, this system simplifies the intelligence process and enables the staff to disseminate results quickly using various intelligence products.

Journal Entries

The first and most important tool is the journal. The journal consists of a Microsoft Excel sheet or a writing pad. The headings for the journal serve an important role that synchronizes the rest of the system. The journal contains the following headings: entry/entity number, time of report, time of activity, unit/asset reporting, activity, and analyst comments (Figure 1).

Entry Number	Time of Report	Time of Activity	Unit/Asset Reporting	Activity	Analyst Comments
1	1030	1025	A TRP, CAV	3x tracked vehicles moving north along ASR Route. Last seen at grid location.	Assessed to be tank PLT.
2	1200	1155	SHADOW	7x vehicles, 1x appears to be POL, stationary at grid location	Assessed to be logistics supply point.

Figure 1. Sample Journal Headings and Entries

Entry/Entity Number. The entry/entity number heading is first in order and links the journal to the entities on the map overlays. The intelligence staff numbers the entries chronologically as the staff receives a report.

Time of Report. In this column, the intelligence staff indicates the time they received the report, not the time the activity within the report occurred. The time of report heading adds data about the report that can identify limitations or capabilities within the friendly forces' information collection apparatus. Delayed reports may indicate weak reporting SOPs or some other battlefield action that constrains the friendly forces' asset. Rapid and accurate delivery of the report may indicate well-trained or capable assets.

Time of Activity. The time of activity heading enables the intelligence staff to indicate the time an action occurred rather than the time the staff received the report. This prevents inaccuracies in the assessment of the information because there will be a delineation between the time the report was received and the time the action occurred.

Unit/Asset Reporting. The intelligence staff indicates the unit or collection asset that delivered the report. The data in this heading supplements known information about the battlefield, as it shows a relation between the sensor/observer and the observed area or unit. This data can assist future collection planning and can provide a capability needed to refine a report.

Activity. The intelligence staff provides as much detail as needed to understand the activity reported. It is important to note all the information possible from the report as well as the accuracy of the report itself. Only known information should go in this section. All assessments or clarifications will go in the analyst comments section.

Analyst Comments. This section enables the analyst receiving the report, or the senior intelligence member on shift, to make comments and assessments regarding the report. One example comment is as follows: This unit is assessed to be the same unit as entry number 7, which was reported 30 minutes earlier and comprised the same number and type of vehicles.

Overlays with Legends

The intelligence staff places a clean overlay on a map sheet and creates markings consistent with unit SOPs for alignment and classification. The staff then creates a legend to categorize entities into specific timeframes (Figure 2, on the next page). One way to do this is to create a legend of different colors for a 2-hour period. The amount of time used is dependent on average reports received and operational necessity. The staff can use a smaller timeframe (different colors for 30-minute periods) when receiving a large number of reports and when wanting a more thorough product to analyze. It is important to standardize the colors in the legend so that multiple overlays have the same colors for the same time periods. This standardization will assist the staff when an overlay is complete and ready for analysis.

Personnel

In order to execute this system of analysis, the intelligence staff should assign two personnel per shift to these tasks.

Color	Time
	0001-0200
	0201-0400
	0401-0600
	0601-0800
	0801-1000
	1001-1200

Figure 2. Sample Overlay Legend

The senior analyst should be assigned to the journal in order to facilitate analyst comments and clarify information, while the junior analyst should be assigned to the map overlays. The senior analyst should receive training on conducting a quality control check of the overlays and journal entries. The senior analyst also ensures that the correct colors are used within the correct timeframes and that a fresh overlay is prepared when the timeframes are concluded. When the staff has gathered the tools and assigned the personnel, the system is ready to receive reports.

Capture Information: Report Received and Personnel React

The intelligence staff receives reports through many channels. Upon receipt of a report, the senior analyst begins the journal entry process. At this time, the junior analyst will assist the senior analyst and request more information as needed in order to complete the journal entry for that report. Once the senior analyst has concluded the journal report, the junior analyst begins the overlay entry. The senior analyst conducts a quality control check of the journal and the overlay once the report entry is complete.

When there is a shift change or an overlay is complete, or in accordance with unit SOPs, the two analysts conduct an update brief on major events and complete a handover. Although an analysis of the overlay can occur at any point, a completed overlay provides the most information of intelligence value.

Analysis: Rucking through the Muck

Once the staff completes two or more overlays, the analysis can begin. These products have three focus areas:

- Analysis of actions related to time (analysis of colors).
- Analysis of activity relationships (trends in actions).
- Analysis of operations (patterns across the scope of the battle period).

All three focus areas will indicate to the staff the capabilities, constraints, and preferences that the enemy/threat may have.

Look for Patterns in Colors. Groupings of color-coded entries, or consistent entries through the battle periods, may identify similar activities based on time. This analysis could show that the enemy conducts resupply within the same 2-hour timeframe every day, or that the enemy always starts reconnaissance an hour before dawn. This analysis can also aid planning efforts for future information collection.

Look for Patterns in Activities. Trends in activities will indicate enemy battle drills and SOPs. The staff can identify these trends through analysis of similar activity types through the battle periods. One example could be that the enemy typically initiates jamming activities when the main body begins movement for operations. This analysis can assist the staff in understanding the operational environment. Additionally, the staff can "backwards" analyze these trends to assess when the enemy publishes orders and conducts rehearsals.

Look for Patterns across the Scope of Operations. The intelligence staff then combines the trends in time and the trends in activity analysis to identify patterns across the enemy scope of operations. Identification of trends begins to illustrate an enemy commander's decision-making process, the commander's preferences, the staff's planning timelines, and the unit's SOPs. For example, when the S-2 determines that the enemy artillery units move forward an hour

Photo by Todd Pruden

Soldiers of the 321st Military Intelligence Brigade conduct a briefing at their tactical operations center at Camp Bullis, TX, July 21, 2017, during Exercise Always Engaged, an Army Reserve military intelligence training mission.

before a reconnaissance mission begins and that the reconnaissance for an enemy offense consists of a similar task organization. This analysis can then be summarized through refined threat models and capabilities.

Application: Making Sense of It All

Now it is time to finalize the analysis so that the staff can disseminate the intelligence or brief it to the commander.

Situational Understanding in Current Operations. The first application of this procedure is the use of the overlays and journal to increase situational understanding for the battle period. These overlays help to build the threat portion of the common operational picture (COP) that tracks all enemy movements and assessed movements within their respective timelines. The threat portion of the COP then feeds the overall COP and provides the intelligence staff with hard data to justify assessments made regarding enemy actions or intent.

Understand Operational Timelines. As the intelligence staff analyzes more data, the staff will become familiar with the capabilities and limitations of the enemy. This extends to knowledge of operational timelines and the relationship between units on the battlefield. For example, competent analysis of data may show that one enemy force typically emplaces its reconnaissance elements between 4 and 6 hours before executing a mission. In this example, an intelligence staff can more accurately predict enemy actions, which enables the friendly force commander to interject into the enemy decision cycle.

Analysis of the Enemy Commander's Decision Process. If the friendly force continues detailed information collection and robust analysis, this analysis may offer insight into the preferences, strengths, and weaknesses of an enemy commander. The intelligence officer may observe, over time, the decision-making process that the enemy commander uses. To facilitate this, the intelligence staff should begin pattern analysis of the enemy commander with specific priority placed on when and how the commander makes decisions.

The intelligence staff can then disseminate the results of the analysis obtained through these procedures efficiently across the force. The assessments and threat models can be shared through digital and analog platforms in intelligence summaries and other products. Any member of the intelligence staff can brief results to the commander and staff with confidence in assessments from this thorough data analysis.

Conclusion

While the incredible amount of information that flows through a command post can very easily inundate the intelligence staff, this information can have immense intelligence value. These procedures of comprehensive analysis provide the intelligence officer and staff a simple and effective tool to receive reporting, analyze the data, and synthesize intelligence products to increase situational understanding, accuracy of assessments, and knowledge about the enemy commander. These procedures establish one way for the intelligence staff to execute situation development. Efficient situation development gives the friendly force commander an advantage because the intelligence officer delivers relevant, timely, and accurate intelligence that may provide the friendly force commander windows of opportunity to reach a position of relative advantage.

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Analysis of Intelligence Analysts' Mid-Career Experience Level

by Sergeant First Class Ric Craig

Introduction

Most junior to mid-level intelligence analysts have little to no experience conducting their military occupational specialty (MOS) 35F individual tasks, partially because of the length of time that elapses between the analysts' initial MOS training at the 35F10 Intelligence Analyst Course and their attendance at the 35F30 Intelligence Analyst Advanced Leader Course (ALC). Little research exists on the effective experience level of these analysts, specifically as it relates their training to their experience, and vice versa. To fill this void, the author, assisted by other 35F instructors, conducted research on 35F ALC students' pre-training knowledge, skills, and abilities (KSAs) at the 122nd Regional Training Institute in Marietta, Georgia. The One Army School System has increased cross-component training environments; therefore, instructors who prepared the analysis were able to consider all components (Active, Reserve, and National Guard).

The objective of this research was to help courseware developers improve their understanding of the target audience, thereby better informing the analysis phase of the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) process (shown in Figure 1). This information will help instructors at regional training institutes and proponents to generalize their students' abilities and tailor instruction according to a class's knowledge level. It will also help strategic organizations to understand inherent systematic weaknesses so that they can adjust systems, processes, and procedures to strengthen knowledge retention. Additionally, units will get a clearer picture of population statistics to help assess their Soldiers and refine talent management.

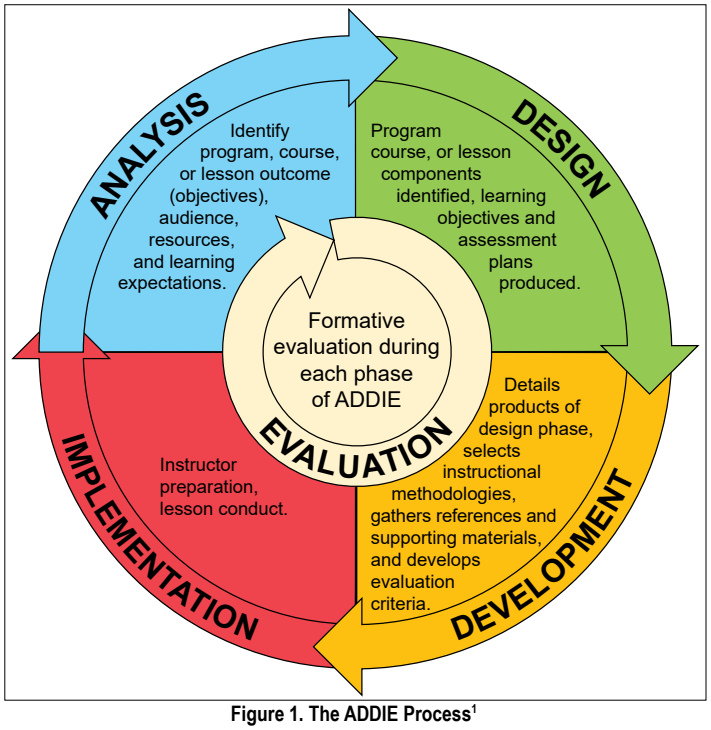


Figure 1. The ADDIE Process[1]

One Army School System

The Army created the One Army School System to enable "Active Component and Reserve Component Soldiers [as well as National Guard] to receive high-quality and standardized education from any Army school, regardless of component, thus making the most effective use of existing school capacity and providing the Army with trained and ready Soldiers in a timely and efficient manner. The One Army School System is made up of Active and Reserve Component schools and centers and is designed to provide the most relevant and realistic training feasible to the Army as a whole. It also includes standardized course content, standardized course design and delivery and quality assurance verification of training standards and outcomes."[2]

Method

In 2018 and 2019, students attending the 35F ALC at the 122nd Regional Training Institute in Marietta, Georgia, performed pre-tests. Of the 161 students who completed the pre-test, data from 2 students was invalid because of a high number of unanswered questions. The student population (n=159) consisted of sergeants (n=123) and staff sergeants (n=36). It represented all three Army components: Active (n=29), Reserve (n=25), and National Guard (n=105). Students (all 3 components) came from 35 different states and 145 different unit identification codes.

During in-processing to the 35F ALC, students received a pre-test packet and instructions to complete the test. The pre-test packet was comprised of a knowledge pre-test, a leader behavior scale, and a KSA assessment. The students answered the pre-test using a handheld student response system.

A limitation to the research project was the low number of questions (11) on the knowledge pre-test. Having fewer questions resulted in a wider margin of error when estimating a student's knowledge. Further, because the knowledge pre-test addressed only 3 of 10 terminal learning objectives (TLOs), 7 TLOs were not measured.

One noted weakness identified during the data collection phase of the research was the potential disparity between the usage of skill level 3 TLO action verbs with skill level 2 (sergeant) and 3 (staff sergeant) Soldiers. The KSA pre-test assessed their performance of each TLO in terms of action verbs, designed as tasks for skill level 3 Soldiers.

Relationship between a Learning Objective Action Verb and the Level of Learning

Certain words tend to imply certain types of behavior. For example, "Name" requires the student to recall the name of a person, place or thing. "Describe" requires the student to know what the person, place or thing is, as well as go a step higher and give examples of the person, place or thing. "Give examples" requires a higher level of cognition on the part of the student, and this elevates the learning level. Instructors and curriculum developers select only one appropriate action verb that corresponds to the learning level of the learning objective per TLO...The action verb indicates the expected student behavior.[3]

One could argue that skill level 2 Soldiers (sergeants) would not typically have received training or performed a task designed for a skill level 3 Soldier. This would therefore reduce the validity/reliability of the data collected. The author, however, believes that most students taking the pre-test do not have a working knowledge of Bloom's Taxonomy, lesson design, or action verb usage in objective statements. The students would therefore read the action verb in the question stem with a broader definition and would answer the question more generally. For example, while those educated in the usage and meaning of action verbs understand the difference between "lead" and "coordinate," most students would generalize their meanings, resulting in the same answer. Further, decreasing the point value of each question by one would be roughly equivalent to lowering the question stem to the next level of Bloom's Taxonomy. This would result in higher percentages in the area of KSAs. However, it would not change the delta between evaluated categories (i.e., Active versus Reserve versus Guard, or sergeant versus staff sergeant). It would also increase the distance between self-assessed knowledge and performance on the knowledge pre-test (of which the questions fall within the first two levels of Bloom's Taxonomy, shown in Figure 2).

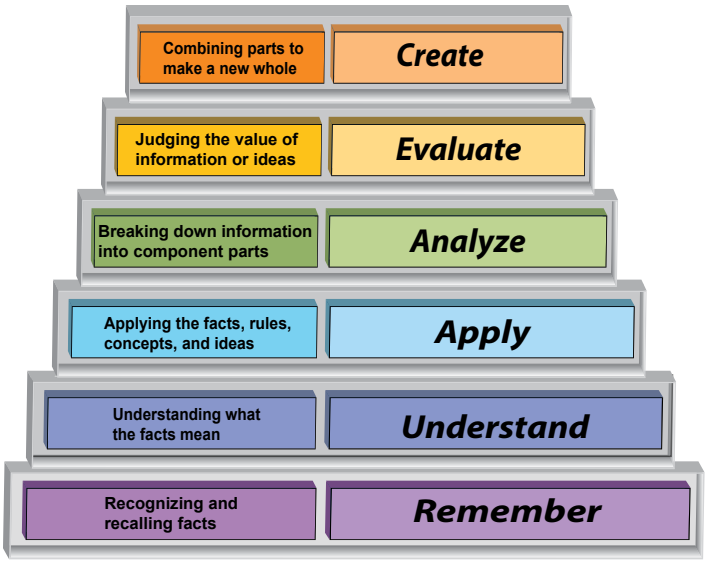


Figure 2. Bloom's Taxonomy

Bloom's Taxonomy is a classification system used to define and distinguish different levels of human cognition—i.e., thinking, learning, and understanding. Educators have typically used Bloom's taxonomy to inform or guide the development of assessments (tests and other evaluations of student learning), curriculum (units, lessons, projects, and other learning activities), and instructional methods such as questioning strategies. Bloom's taxonomy was originally published in 1956 by a team of cognitive psychologists at the University of Chicago. It is named after the committee's chairman, Benjamin Bloom (1913–1999).[4]

Analysis

The knowledge pre-test is an 11-question, multiple-choice test that the U.S. Army Intelligence Center of Excellence developed for the 35F ALC curriculum. The questions cover 3 of the 10 TLOs taught, specifically Intelligence Preparation of the Battlefield (IPB), Information Collection (formerly known as Intelligence, Surveillance, and Reconnaissance), and Targeting.

The leader behavior scale is a 50-question, multiple-choice test that the Center for Army Leadership developed under the Multi-Source Assessment and Feedback program. The students had to complete the self-assessment portion but did not have to obtain feedback from peers, subordinates, or superiors. An example stem is, "Establishes clear intent and purpose." The student selects an answer ranging from "very ineffective" to "very effective."

The research author designed the KSA assessment. Each 35F ALC TLO functioned as a question stem. Development of the alternatives (possible answers) used the U.S. Office of Personnel Management's KSAs. This allowed students to self-assess their experience level with each learning objective. An example question stem is, "Utilizing Distributed

Common Ground Station [System]-Army (DCGS–A) Applications in order to support intelligence operations." The available answers are:

A) I have not had education, training, or experience in performing this task.

B) I have had education or training in how to perform this task, but have not yet performed it on the job.

C) I have performed this task on the job. My work on this task was monitored closely by a supervisor or senior employee to ensure compliance with proper procedures.

D) I have performed this task as a regular part of a job. I have performed it independently and normally without review by a supervisor or senior employee.

E) I am considered an expert in performing this task. I have supervised performance of this task or am normally the person who is consulted by other workers to assist or train them in doing this task because of my expertise.

Additional data came from students' files, such as academic evaluation reports ([Department of the Army] DA Form 1059) from the Warrior Leader Course (WLC) (or relevant legacy course) and the 35F10 Intelligence Analyst Course if provided by the student. Further, limited data was available through the Army Training Requirements and Resource System, such as unit identification codes, component code, grade, and state of residence. Lastly, data came from the students' 35F ALC DA Form 1059, as well as their evaluation grades and grade point averages after the students out-processed from the course.

Results

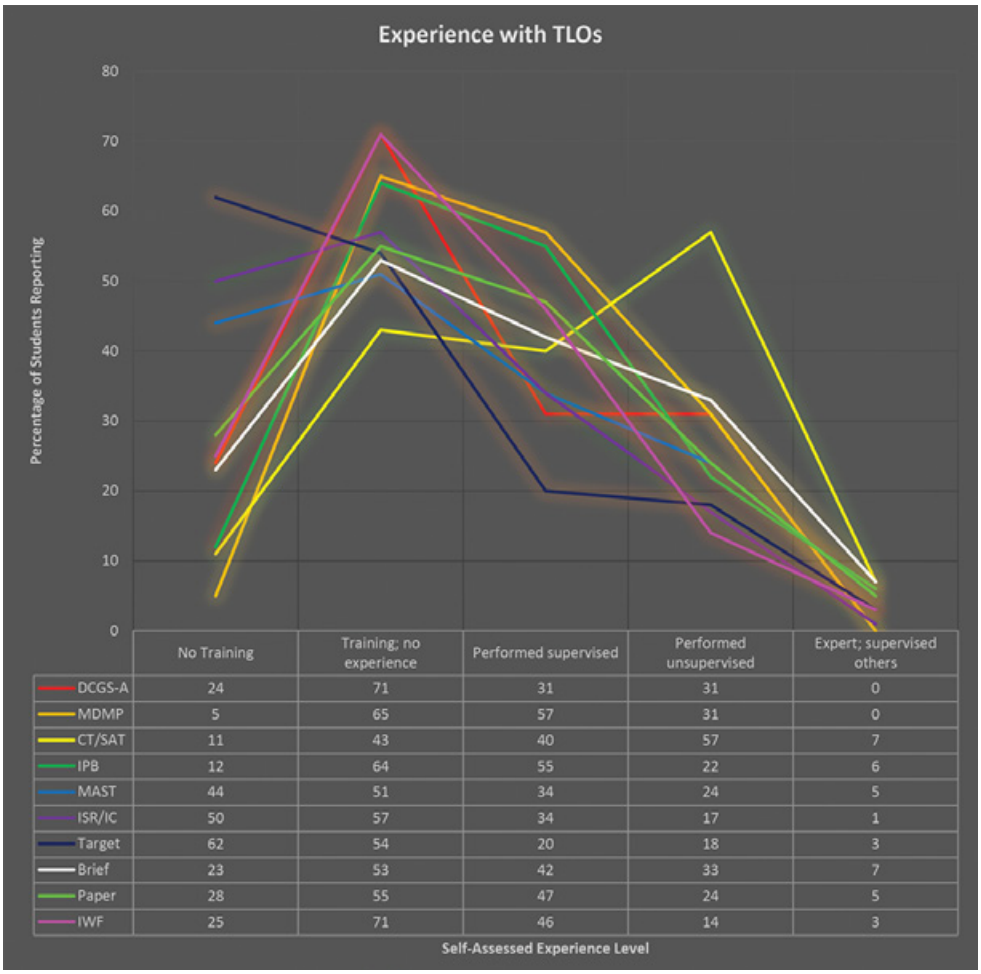
The KSAs allowed students to express their levels of KSA on a range from "no training" to "expert proficiency." As with any spectrum, students claimed a wide array of self-professed experiences. Fourteen percent of students claimed to be an expert in at least 1 TLO. The percentage of students who claimed to be an expert was reduced by half for every additional TLO. No student claimed an expert level proficiency in more than 4 TLOs. This is in contrast with the fact that the number of students who claimed not to have had any training in at least 1 TLO was 64%. Unlike the percentage claiming expertise, this percentage decreases at a steady rate all the way to 9 TLOs. While no student claimed to be untrained in all 10 TLOs, it is disheartening to see that 2% claimed not to have been trained in 9 of the 10 TLOs. Of note, the three students who claimed to have received training in only 1 TLO identified Military Decision-Making Process and IPB. Further, their level of experience in said TLOs was supervised and/or unsupervised performance.

Some slight differences in experience levels were evident between the two ranks. Among staff sergeants, 11% claimed expertise in 1 TLO, while none claimed expertise in multiple TLOs. However, among sergeants, of which 15% claimed expertise in at least 1 TLO, several claimed expertise in multiple TLOs. The rates between sergeant and staff sergeant in TLOs in which they claimed to have had no training were not significantly different. Sixty-five percent of sergeants and 59% of staff sergeants reported not having received training in at least 1 TLO. The claim that multiple TLOs had not been trained indicates sergeants were within plus or minus 3% of the staff sergeants in all categories.

The greatest difference in self-proclaimed experience is between components. Thirty-eight percent of the Active Component Soldiers claimed expertise in at least 1 TLO, compared to 8% of the Reserve Soldiers, and 10% of the National Guard Soldiers. The delta between the percentage of Soldiers who claimed expertise and the percentage of Soldiers who claimed not to have received training was noticeable. While there was a difference of 10% for Active Duty, the delta between Reserve and National Guard was 67% and 55%, respectively.

Three TLOs tied as having 4% of the students claim they were experts: Critical Thinking/Structured Analytical Techniques (CT/SAT), IPB, and Briefing. However, CT/SAT and IPB ranked the highest for overall proficiency because they had the largest number of experts with the fewest number of untrained. Many students (39%) stated they had no training in Targeting, while 32% claimed no previous training in Information Collection. The TLO that rated third highest in the number of students who claimed to have never had any training is Manage All-Source Training at 28%. Information Collection, Targeting, and Manage All-Source Training ranked lowest in experience with the lowest numbers of experts and highest numbers claiming no training.

Three unique patterns in the TLO analysis were evident. All TLO trend lines, except for 2, demonstrated a distinct pattern: each has a moderate percentage of No Training, peaks at Training/No Experience, falls at varying rates to Performed Supervised, and then to Performed Unsupervised, falling to the lowest point of Expert/Supervised Others. However, Manage All-Source Training and CT/SAT stand out. CT/SAT starts with a low (11%) No Training and plateaus at Training/No Experience and Performed Supervised. It then increases to its peak (57%) at Performed Unsupervised before falling to the low (7%) of Expert/Supervised Others. Targeting starts at its high point (62%) with No Training before it continues the typical pattern of falling to a low point of Expert/Supervised Others. Figure 3 (on the next page) shows detailed results of the research.



	No Training	Training; no experience	Performed supervised	Performed unsupervised	Expert; supervised others
DCGS-A	24	71	31	31	0
MDMP	5	65	57	31	0
CT/SAT	11	43	40	57	7
IPB	12	64	55	22	6
MAST	44	51	34	24	5
ISR/IC	50	57	34	17	1
Target	62	54	20	18	3
Brief	23	53	42	33	7
Paper	28	55	47	24	5
IWF	25	71	46	14	3

Figure 3. Self-Assessed Experience Levels

Overall, the passing rate for the 35F ALC was 93%. Of the 12 students who failed to achieve course standards, 8 were sergeants and 4 were staff sergeant. Looking at components, they included 1 Active, 3 Reserve, and 8 Guard. Further, 67% of those students were dismissed because they did not achieve a passing score on the Army Physical Fitness Test or, to put it another way, 5% of ALC students failed the fitness re-test. Of all academic dismissals, 2 were for failure to achieve standards on the military briefing, while 1 was for failure to achieve standards on the written country assessment paper. Three administrative drops occurred: 1 because of illness and 2 resulting from injuries sustained during the Army Physical Fitness Test (which are not included in the 5% shown above).

The analysis did not use the leader behavior scale pre-test extensively. This was largely due to no identifiable potential correlations. The analysis did however include the relationship between the students' average leader behavior scale answer and the rating received for the Demonstrated Abilities of Leadership on the Phase 2 DA Form 1059. There was a –0.07 correlation value, or no significant correlation. This means the students' self-assessment of their own leadership has no predictive value as to how instructors will assess them on their leadership abilities.

Very little identifiable correlation existed between 35F ALC pass rates and other variables. However, one correlation that stood out was the 0.35 moderate positive correlation between the DA Form 1059 Performance Summary from WLC and the DA Form 1059 Performance Summary earned at 35F ALC. Of the ALC students (whose WLC 1059 was obtained [n=89]), 34% had achieved Exceeds Course Standards in WLC. For ALC, 10% received Exceeds Course Standards in Phase 1 and 19% received Exceeds Course Standards in Phase 2. (The Phase 1 rate is generally lower because initial Country Assessment Paper failures prevented students from receiving Exceeds Course Standards.) A remarkably high number of students achieved Exceeds Course Standards in both WLC and ALC: 11% (6 Guard Soldiers and 4 Active Soldiers).

Discussion

As one would expect, Active Duty Soldiers reported a higher frequency of expertise in TLOs by a large margin over their Reserve and National Guard counterparts. This is likely a direct result of their full-time employment as intelligence analysts, whereas only a handful of Reserve and National Guard Soldiers work as intelligence analysts outside their military capacity.

The TLO related to CT/SAT ranks relatively high in experience rating. That is to say, 34% of Soldiers have no experience, while 40% have performed unsupervised or supervised others. When compared to published research studies, this is not unusual; however, it could potentially lead to overconfidence in Soldiers' abilities. For example, a 1995 study showed, among other findings, that 89% of respondents believed critical thinking was highly important in their teachings; however, only a small minority (9%) were using critical thinking and fewer (8%) could actually describe it.[5] This would explain why across all TLOs, CT/SAT has almost twice the number of Soldiers who have unsupervised performance or expertise than any other 2 TLOs combined.

Another way to look at experience level is to focus on the difference between the percentage of students who claim not to have any training on a TLO and the percentage of students who claim to have an expert level of knowledge on a particular TLO. The larger the delta, the more uneven the experience level is across the force. The top 3 TLOs in this category are Manage All-Source Training (24%), Information Collection (30%), and Targeting (37%).

Conclusion

Most junior and mid-level intelligence analysts have little to no experience in conducting 35F individual tasks. Measuring all students against all critical individual tasks shows that 55% have either no training or no experience. This is contrasted with 19% who have performed the critical individual task unsupervised or have supervised others in doing the task. This leaves 26% of intelligence analysts who have conducted the critical individual task under supervision.

Preliminary analytical data suggests that the average time between when a Soldier completes the 35F10 Intelligence Analyst Course and when the Soldier arrives at 35F ALC is 6.2 years. This puts a lot of weight on the shoulders of the unit skill level 2 training program. This unit level training is vital to retention of skill level 1 knowledge, as well as the acquisition of skill level 2 knowledge. The program's design incorporates annual, semiannual, and quarterly training on individual tasks. Anecdotal evidence from students' small group discussions within the Manage All-Source Training lesson plan suggests that very little unit level training on 35F individual tasks is taking place, particularly if the Soldier is in a non-military intelligence unit. An improvement in individual tasks will lead to improved collective tasks and, ultimately, will support unit mission essential tasks and unit readiness.

The subject areas of Targeting, Information Collection, and Training have the highest need for training, as indicated by the difference between the high number of students who claimed not to have had any training and the low number of students who claimed to be an expert. Having a particular emphasis on Training (as in "Implement All-Source Intelligence Training" and "Develop All-Source Intelligence Training") will boost training in the subject areas of Targeting and Information Collection.

Lastly, to increase student success at 35F ALC, unit leaders and potential students should focus on improving their Army Physical Fitness Test score, writing skills, and military briefing abilities. The statistics show these are the top three reasons why 35F ALC students are unsuccessful in ALC.

Endnotes

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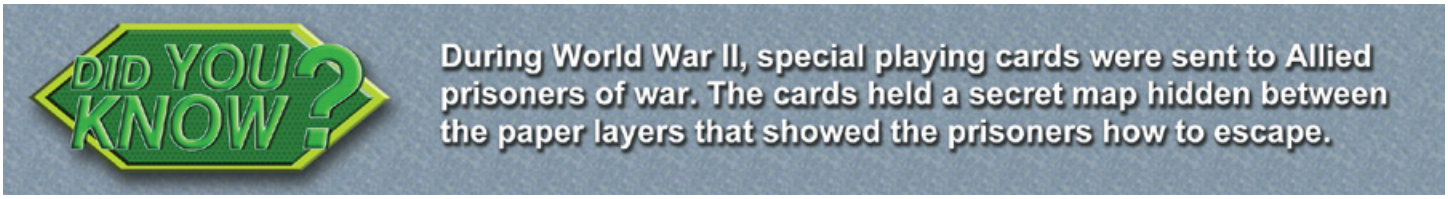
Thank you to SFC Hutton, SFC Ritchie, SSG Lyons, and all the 35F instructors who helped collect and maintain meticulous data and are always trying to improve the foxhole.

SFC Ric Craig is the course manager of the 35F10 Intelligence Analyst Course at the 122nd Regional Training Institute in Marietta, GA, where he also teaches in the Intelligence Analyst Advanced Leader Course and Human Intelligence Collector Course. He holds military occupational specialties of Counterintelligence Special Agent, Human Intelligence Collector, and Intelligence Analyst. He served as a tactical human intelligence collector in Iraq in 2006 and as a senior counterintelligence support specialist contractor in Afghanistan in 2013. He also served one tour as a contractor with the Defense Intelligence Agency in 2015. SFC Craig holds an associate of applied science degree in intelligence operations with a concentration in counterintelligence operations, a bachelor of arts degree in intelligence studies with a concentration in terrorism studies, and a master of arts degree in intelligence studies with a concentration in intelligence collection. His research and professional interests include counterespionage, cognitive behavior, and critical thinking.



The publication of FM 3-0, *Operations,* in October 2017, marked a significant change in Army doctrine. Refocusing the Army on large-scale ground combat operations was the most important of these changes. FM 3-0 also introduced new, or considerably modified, doctrinal concepts such as—

- Peer threats.
- Army strategic roles.
- Multi-domain operations.
- Operational framework.
- Windows of opportunity.
- Positions of relative advantage.

Because of this new Army doctrinal focus, the U.S. Army Intelligence Center of Excellence (USAICoE) started the effort to reset the entire intelligence doctrine library to align with the Army's operational doctrine. The first phase of resetting intelligence doctrine is revising the fundamental intelligence publications. USAICoE is well on the way to completing this first phase. Illustrated below is the status of phase one.

The most recent success in resetting fundamental intelligence publications is ATP 2-33.4, *Intelligence Analysis,* which was published in January 2020. Like all the fundamental doctrinal publications, ATP 2-33.4 reinforces large-scale ground combat operations and other key FM 3-0 doctrinal concepts. The publication provides fundamental information on how intelligence professionals conduct analysis, including the intelligence analysis process and specific analytic techniques, in order to provide timely and relevant intelligence to the commander and staff. ATP 2-33.4 describes the six aspects of effective analysis and emphasizes the basic thinking abilities analysts should apply to develop effective intelligence. A number of areas in the Army techniques publication changed significantly from the last version; however, Part 2 of the publication, which discusses the various techniques, changed very little.

The new version of ATP 2-33.4—

- Aligns to ADP and FM 2-0, *Intelligence*.
- Is linked to ATP 2-01.3, *Intelligence Preparation of the Battlefield.*
- Is linked to the newest draft ATP 2-01, *Collection Management.*
- Improves the clarity of the previous version and fills some gaps.
- Includes a logic map as a figure within the introduction.
- Improves significantly the intelligence analysis process.
- Includes new chapters, graphics, and examples on analysis that align to large-scale ground combat operations.
- Includes new appendixes, such as intelligence support to targeting.

The following URL will navigate to the ATP 2-33.4 download page at the Army Publishing Directorate website:

https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=1008410

If the URL does not automatically direct you to the download page, use the following steps to manually navigate to the ATP 2-33.4 download page:

1) Go to https://armypubs.army.mil/
2) Click on 'Publications'. (In the green banner immediately under the APD seal at the top of the page.)
3) From the drop-down menu, click on 'Doctrine and Training'.
4) From the subsequent drop-down menu, click on 'ATP-Army Techniques Publications'.
5) Scroll down to 'ATP 2-33.4'. (The publication type and number are in blue text along the left side of the page.)
6) Click on the text 'ATP 2-33.4'.

Once on the download page, take the following steps to download the ATP:

1) In the new web browser tab or window, click on 'PDF'. (The text 'PDF' is in blue.) The PDF file will begin downloading or open in a new web browser tab or window.
2) Save the PDF file to your computer or device.

As intelligence professionals, you need to be proficient in the fundamental doctrine. The USAICoE Doctrine Division also counts on you to provide feedback on doctrinal issues. If you need doctrinal assistance or have important feedback, please contact the doctrine division at usarmy.huachuca.icoe.mbx.doctrine@mail.mil.

Leveraging Multifunctional Brigade Expertise in Support of the Division Deep Fight

by Major Michelle S. McCarroll

Deep attack is not a luxury; it is an absolute necessity to winning.
—GEN Donn A. Starry

Introduction

FM 2-0, *Intelligence*, and ATP 2-03.1, *Intelligence Preparation of the Battlefield*, both identify intelligence preparation of the battlefield (IPB) as a collaborative staff effort led by the J-2/G-2/S-2.[1] The staff's collaboration ensures a thorough description of the operational environment and associated threat. Each warfighting function refines the intelligence staff's analysis with the application of function-specific operational expertise. Historically, intelligence professionals and planners have referred to this concept as reverse warfighting function IPB.[2] At the division, the G-2 must leverage this expertise not only from the organic division staff but also from its associated functional and multifunctional brigades, especially its combat aviation brigade and division artillery.

In large-scale ground combat operations, the division's IPB must pay particular attention to enemy long-range artillery and air defense in the deep area, beyond the range of the brigade combat teams (BCTs) engaged in close operations.[3] In addition to identifying opportunities for the BCTs to exploit, disrupt, and mass effects, the division must shape the deep area to create conditions that support the BCTs' present and future maneuver. Outside of the BCTs, the division must integrate and synchronize the operations of its

Photo by U.S. Army SGT James Lefty Larimer

United States and Kuwaiti soldiers fire mobile artillery rockets during a joint live-fire exercise near Camp Buehring in Kuwait, January 8, 2019.

functional and multifunctional brigades. In the deep area, this means leveraging multifunctional brigades that share the division area of operations and are the only forces able to range the division deep area. In particular, the division artillery S-2 (or field artillery brigade acting as the division artillery and force field artillery headquarters) and combat aviation brigade S-2 have important roles in assessing enemy formations operating in the division's deep fight.

The division artillery commander is the fire support coordinator for the division and primary advisor to the division commander for the fires warfighting function, and the combat aviation brigade commander is the senior Army aviation officer in the division charged with advising adjacent and higher echelon commanders on aviation system employment. These commanders and their staffs have a significant role in the division's IPB as a complete, collaborative staff effort.[4] Without the division artillery S-2 and combat aviation brigade S-2's input, the division's IPB risks being incomplete with regard to the operational environment, threat, and potential impacts on friendly operations emanating from and operating within the division's deep area. In warfighter exercises, this area accounts for the preponderance of a BCT's combat losses, which they are organically unable to impact. Furthermore, without the same organic intelligence capabilities as the BCTs, the division artillery and combat aviation brigade S-2s rely on capabilities and functions only available within the division G-2 or through coordination for outside augmentation. This codependency to tackle the critical deep area problem set in large-scale ground combat operations signals the need to update our standard operating procedures and, eventually, doctrine on the role of the division artillery and combat aviation brigade in IPB and the integration of the division intelligence warfighting function, including multifunctional brigade S-2 sections.

U.S. Army photo by SGT Thomas Mort

An AH-64 Apache helicopter with 1st Combat Aviation Brigade, 1st Infantry Division, flies out into the box as an observer coach/trainers' helicopter trails behind, during a simulated attack mission, as part of the culminating force on force exercise of Combined Resolve XII at the Joint Multinational Readiness Center in Hohenfels, Germany, August 19, 2019.

During Initial Military Decision-Making Process

Observer coach/trainers (OC/Ts) for the Army's Mission Command Training Program see at least five warfighter exercises with one or more divisions per exercise focused on large-scale ground combat operations against a hybrid near-peer opposing force. Within the multi-domain operations construct, these operations most closely align with the disintegrate and exploit phases during which friendly forces defeat enemy long-range and mid-range systems.[5] OC/Ts watch the military decision-making process and execution, capturing key observations for the division and its multifunctional brigades, including the division artillery/field artillery brigade and combat aviation brigade. At least 80 to 90 percent of divisions and multifunctional brigades conducted separate IPB and military decision-making process cycles using parallel planning, while 10 to 20 percent use collaborative planning.[6]

Though staffs coordinate across echelons during parallel planning, they must both conduct their own IPB and military decision-making process. Therefore, two separate assessments of the operational environment and the resulting recommendations on fire support, targeting, and aviation support must be synchronized, de-conflicted, and adjusted to varying degrees during the divisions' combined arms and fires rehearsals. While ADP 5-0, *The Operations Process,* highlights that parallel planning can "significantly shorten planning time," in the case of the division's multifunctional brigades, the back and forth that often results from resynchronizing the IPB and adding the multifunctional brigades' expertise decreases the time available for their staff's planners, affecting the timing and efficacy of field artillery and combat aviation.[7]

Often, multifunctional brigades use the division IPB as a starting point and add a layer of expertise with regard to those systems or units most pertinent to their organization—whether air defense, long-range artillery, or electronic warfare. The IPB efforts of the division artillery/field artillery brigade and combat aviation brigade usually address and refine the analysis of those threat systems in the deep area that, due to range, lethality, and/or ability to create standoff, will ultimately constitute the division's high-payoff target list. This is information that affects the BCTs' planning as well as the division's initial information collection requirements and requests. Too frequently, this refinement to the division collection plan is not captured because

of a lack of designated and/or qualified collection managers at the multifunctional brigades. This is a product of the multifunctional brigade S-2 sections' current composition, not a unit's lack of emphasis or effort toward collection management. However, closer integration with the division G-2 and incorporation of the multifunctional brigades into the division's IPB can decrease the gap between the division collection plan and the multifunctional brigades' requirements, particularly with regard to the deep fight.

The integration that occurs by doing IPB with the division allows the multifunctional brigades to leverage the division collection manager and allows him or her to be aware of requirements to support deep targeting earlier in the operations. Doing so ensures that fires can continue to be the "maneuver commander's most responsive combat arm and by doing so assist the other arms in accomplishing their battlefield missions."[8]

U.S. Army National Guard photo by SGT Saul Rosa

Virginia National Guard Soldiers assigned to the 116th Infantry Brigade Combat Team use a magnetic map board to track troop movement during a command post exercise April 14, 2018, at Fort Pickett, VA. Overseeing the exercise were observer coach/trainers from the Mission Command Training Support Program.

During Operations

Once operations (particularly large-scale ground combat) begin, the integration between the division G-2 and its multifunctional brigade S-2s becomes more important. The fight is fast, deadly, and dynamic, making IPB's ongoing assessment and updates challenging while they remain critical to success. Thorough, complete products synchronized across the division and its multifunctional brigades from the initial IPB make both organizations more agile, but they must also have standing processes in place to ensure shared continuous assessments and updates. The multifunctional brigades continue to be a hub of specialized expertise critical to providing the division a complete picture. From the division artillery's target acquisition radar analysis to the combat aviation brigade's aviation mission survivability officer's input, multifunctional brigades continue to provide critical portions of the division's IPB overlays; however, they cannot complete the task alone.

Unlike their BCT counterparts, the multifunctional brigades often lack the military occupational specialties, functional sections, and/or equipment to process specific intelligence disciplines. Integration with the division G-2, especially the analysis and control element, provides multifunctional brigades the support required to create true fused all-source intelligence. Developing standard operating procedures, and eventually doctrine, to define these relationships is critical to maintaining analytic exchange and support at the speed of large-scale ground combat operations.

The greater the integration between the division and its multifunctional brigades prosecuting the deep fight, the more capability and capacity the division has to assess the threat in both the close and deep areas, ultimately allowing the division to provide better support to its BCT maneuver forces. Speed and integration in the deep fight create time and space for the BCTs. They also prevent a common problem that Mission Command Training Program OC/Ts see with multifunctional brigades. When multifunctional brigades are not well integrated with the division, their planning and synchronization timeline become the same as their BCT counterparts. However, within the operational framework, these multifunctional brigades are usually conducting operations ahead of the BCTs in time and space to shape the environment and support their maneuver. Especially in the case of the combat aviation brigade and division artillery, their close ties to the air tasking order cycle, airspace planning, and requirement to receive division and higher battle damage assessments that they cannot generate organically drive a need to plan concurrent with the division, ahead of the BCTs.

Conclusion

Multifunctional brigade S-2s are an integral part of the division's intelligence warfighting function. Without their input, the G-2 is missing valuable expertise and information on the threat picture. This information is critical to the division's responsibilities within its deep area, both in support of its BCTs and within the larger context of multi-domain operations' dis-integrate and exploit phases.[9] Likewise, the multifunctional brigades have significant gaps, especially in large-scale ground combat operations, if they are not well incorporated and synchronized with the division G-2. Incorporating multifunctional brigades in the division intelligence warfighting function, and ensuring they are able to provide their expertise to the division's IPB while leveraging the intelligence enterprise to refine their analysis, begins well before receipt of mission. Divisions must establish the standard operating procedures, architecture, and support relationships to connect and synchronize their multifunctional brigades with the division's intelligence warfighting function to shape the deep area and secure the consolidation area at a pace that supports the speed and lethality of large-scale ground combat operations.

Epigraph

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Endnotes

1. Department of the Army, Field Manual (FM) 2-0, *Intelligence* (Washington, DC: U.S. Government Publishing Office [GPO], 6 July 2018), B-8 (common access card login required); and Department of the Army, Army Techniques Publication 2-01.3, *Intelligence Preparation of the Battlefield* (Washington, DC: U.S. GPO, 1 March 2019), xi.

2. Rob Rouleau and Andrew G. Attar, Jr., "Reverse IPB: A Whole-of-Staff Approach to Intelligence Preparation of the Battlefield," *Small Wars Journal,* March 12, 2013, https://smallwarsjournal.com/jrnl/art/reverse-ipb-a-whole-of-staff-approach-to-intelligence-preparation-of-the-battlefield.

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4. Ibid., 2-14, 2-16.

5. Department of the Army, Training and Doctrine Command (TRADOC) Pamphlet 525-3-1, *The U.S. Army in Multi-Domain Operations 2028* (Fort Eustis, VA: TRADOC, 6 December 2018), 32.

6. CW3 Stephen Barber, e-mail message to author, 6 July 2019; and Department of the Army, Army Doctrine Publication (ADP) 5-0, *The Operations Process* (Washington, DC: U.S. GPO, 31 July 2019), 2-24.

7. Department of the Army, ADP 5-0, *The Operations Process,* 2-24.

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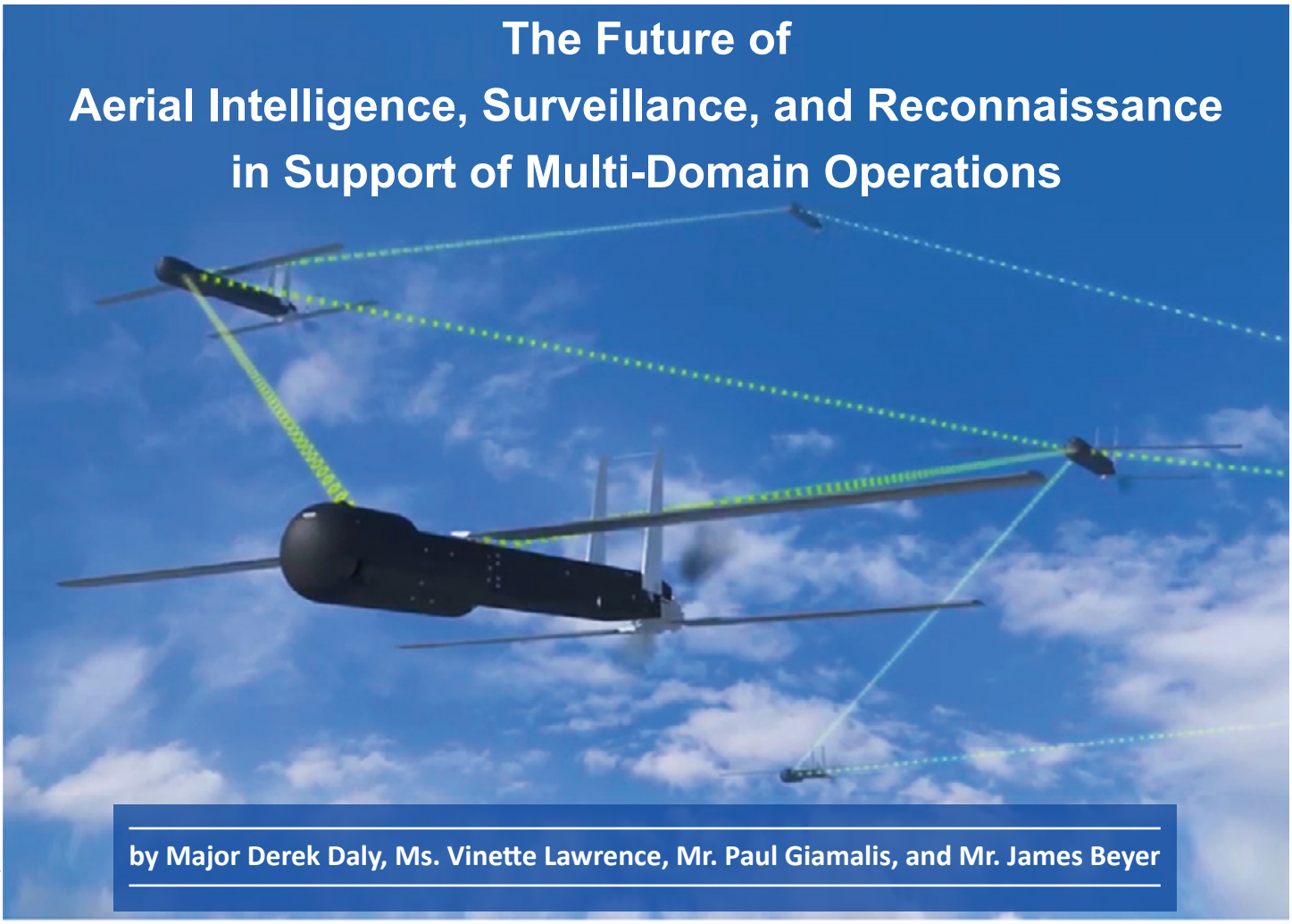
9. Department of the Army, TRADOC Pamphlet 525-3-1, *Multi-Domain Operations,* 32.

MAJ Michelle McCarroll is an intelligence warfighting function observer coach/trainer with the Army's Mission Command Training Program. She holds a master of arts in defense and strategic studies from the U.S. Naval War College and graduated the Maritime Advanced Warfighting School as a Joint and Maritime Operational Planner. Her previous assignments include brigade intelligence officer, 95th Civil Affairs Brigade (Special Operations) (Airborne); Deputy Analysis and Control Element Chief, 4th Infantry Division; and G-2 targeting officer, 4th Infantry Division.

The Future of Aerial Intelligence, Surveillance, and Reconnaissance in Support of Multi-Domain Operations



Courtesy of the U.S. Air Force

by Major Derek Daly, Ms. Vinette Lawrence, Mr. Paul Giamalis, and Mr. James Beyer

Introduction

This article describes efforts to transform the way the U.S. Army conducts aerial intelligence, surveillance, and reconnaissance (AISR) in support of multi-domain operations (MDO) and sets the stage for future force requirements to address AISR modernization. It outlines a paradigm shift in AISR capabilities and examines DOTMLPF–P[1] implications for the capabilities proposed in the following documents:

- *U.S. Army Intelligence Center of Excellence (USAICoE) Aerial Intelligence, Surveillance and Reconnaissance (AISR) in Multi-Domain Operations (MDO) White Paper.*
- *Initial Capabilities Document (ICD) for Multi-Domain Sensing Systems (MDSS).*
- *United States Army Intelligence Center of Excellence (USAICoE), Next Generation Aerial Intelligence, Surveillance, and Reconnaissance (NGAISR) FY18 DOTmLPF-P Assessment.*

The Emerging Operational Environment

Over the past 17 years, the U.S. Army intelligence community focused on counterterrorism and counterinsurgency operations in Iraq and Afghanistan. However, studies of the emerging operational environment describe a future of contested norms and persistent disorder. Adversary nations are developing the means of creating political and military standoff to degrade key capabilities (for example, disrupting access to land, space, cyberspace, and the electromagnetic spectrum). The methods employed in the emerging operational environment will turn long-presumed strengths into potential weaknesses. As a result, the comparative U.S. military advantage and the ability to conduct uncontested operations against a sophisticated adversary have diminished, and the current AISR fleet is ill equipped to operate against peer competitors. The Army, as an element of the joint force, solves this problem by conducting MDO to prevail in competition and dis-integrate enemy antiaccess and area denial (A2AD) systems.

The Operational Problem

Successful operations in such an environment will require AISR to undergo a significant transformation. The current AISR fleet is optimized for counterterrorism and counterinsurgency but has significant survivability challenges against

a peer threat. The adversary's A2AD capabilities present a challenge to the joint/multinational ability to achieve air dominance and control and to project power onto land from the air and maritime domains. In many instances, standoff distances would force current AISR platforms beyond the collection range of named and targeted areas of interest. Army intelligence faces challenges in balancing today's readiness requirements against the requirements of the future fight.

Current AISR Capabilities and Shortfalls

The current AISR fleet is a collection of commercially adapted manned platforms and purpose-built unmanned aircraft systems (UAS). The fleet provides a suite of advanced sensors and technologies enabling cross-cueing, onboard processing, and fusion of geospatial intelligence and signals intelligence (SIGINT) collection in support of tactical maneuver commanders. These capabilities are task organized to provide actionable intelligence to tactical commanders and intelligence products to enable planning and execution at higher echelons. The fleet has several challenges and shortfalls:

- Current capability to develop targets out to the range of emerging fires systems is limited.
- Platforms optimized for aerially permissive environments operate at vulnerable altitudes from vulnerable runways.
- Size, weight, power, and cooling concerns limit the Army's ability to add aircraft survivability equipment.
- Platforms are vulnerable in a peer fight with very few options to improve the survivability of current platforms or sense deep enough to be relevant.
- Platforms are expensive, slow to produce, low density, and difficult to replace.
- Current aerial sensor processing, exploitation, and dissemination (PED) timelines do not support dynamic targeting timelines in large-scale ground combat operations.

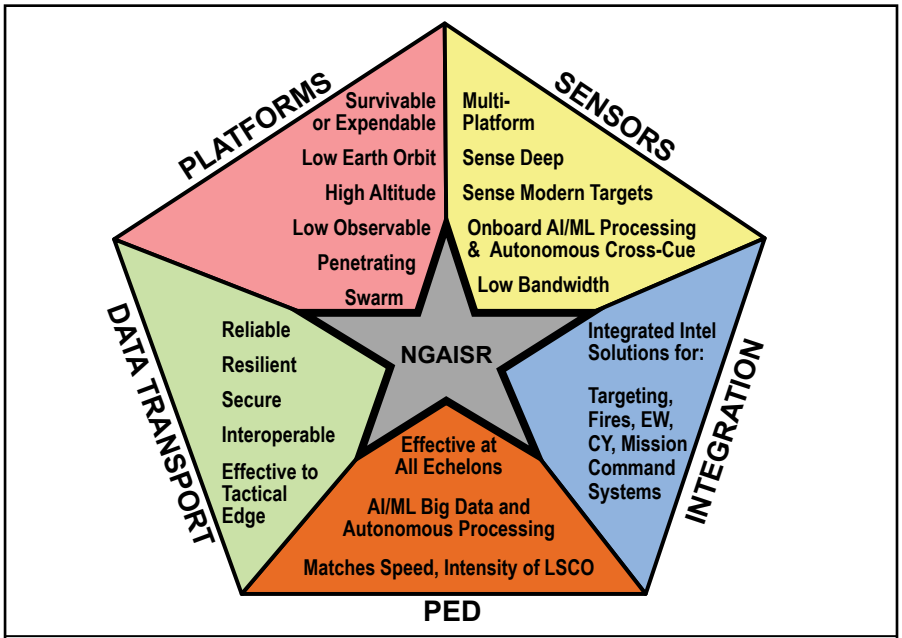
The development of TRADOC Pamphlet 525-3-1, *The U.S. Army in Multi-Domain Operations 2028,* fundamentally changed the vision of AISR operations. With the subsequent incorporation into FM 2-0, *Intelligence*, and FM 3-0, *Operations,* MDO consequently exposed critical shortfalls in AISR capabilities. Furthermore, a plethora of studies, white papers, concepts, and strategies belied the imperative of updating all aspects of AISR in order to align with the modernization efforts of other warfighting functions in the collective pursuit of a third offset strategy.

Central Idea/Solution

The next generation AISR DOTMLPF–P study focuses on future AISR challenges and requirements to examine the readiness of Army aerial intelligence to conduct information collection through 2035. The study provides a solution strategy for the MDO-capable force (by 2028) and the MDO-enabled force (by 2035) and focuses on five major categories, shown in Figure 1, scoped to address appropriate elements of modernization:

- Platforms.
- Sensors.
- PED.
- Data transport/network architecture.
- SIGINT/electronic warfare (EW)/cyberspace integration.

The end state is a force capable of supporting Army and joint warfighting functions in MDO.



AI	artificial intelligence	LSCO	large-scale combat operations
CY	cyberspace	ML	machine learning
EW	electronic warfare	NGAISR	next generation aerial ISR
ISR	intelligence, surveillance, and reconnaissance	PED	processing, exploitation, and dissemination

Figure 1. Multi-Domain Sensor Systems Required Capabilities

To achieve this, the Army must provide agile, adaptable, interoperable, multimodal, and multifunctional AISR capabilities to operate in a highly contested and complex environment in multiple domains. Multimodal is based on principles of sensor diversity meant to simultaneously detect multiple characteristics and signatures emitted by

targets of interest. The objective of multimodal sensing is to increase detection accuracy and reduce false alarm rates while operating in a complex, cluttered environment. Multifunctional refers to the ability to employ a variety of capabilities to perform multiple Army warfighting functions simultaneously, or in combination, to achieve a certain effect or outcome. The future AISR fleet must provide commanders with shared situational understanding in all phases and operational environments, across the range of military operations, including against peer threat competitors posing complex A2AD and overmatch dilemmas in depth. Desired outcomes include—

- The right mix of capabilities to fulfill requirements of commanders in competition and armed conflict.
- AISR operations beyond mid-altitude constraints in large-scale ground combat operations.
- A complementary family of airborne multi-intelligence, multimodal, multifunctional technical sensors with improved operational flexibility, joint interoperability, tactical responsiveness, and the ability to service sophisticated targets.
- Improved integration initiatives with standards-based interoperability to support agility, partnering, and cross-domain synergy in support of penetrating ISR and long-range precision fires.
- Artificial intelligence and machine learning as critical enablers throughout the tasking, collection, processing, exploitation, and dissemination and analysis process.
- Reconfigurable platform architectures with multilevel security communications and data transport capability.
- The ability to survive and operate in A2AD environments and in congested, contested cyberspace and electromagnetic spectrum environments.
- Shortening of the sensor-to-shooter link to account for the threat's mobility and the tempo of MDO. This includes addressing PED and integration with mission command systems.
- Organization of the AISR force to support commanders at echelon, specifically at echelons above brigade.

Near-Term Solution Strategy (Present to 2025)

The next generation AISR DOTMLPF–P study advocates a capability development and deliberate modernization strategy predicated on an agile and adaptive approach that reflects careful stewardship of allocated resources and accounts for risk, fiscal reality, and state of technology. In order to do so, future AISR systems must develop and leverage foundational and interrelated capabilities. The near-term solution strategy includes platforms, sensors, PED, network/architecture, and SIGINT/EW/cyberspace integration.

U.S. Army photo illustration by David Vergun

Kestrel Eye is an electro-optical nanosatellite developed by the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command. It will improve mission command on the move for brigade combat teams, allowing tactical leaders to synchronize action, seize the initiative, and maintain near real time situational awareness.

Platforms: Platforms associated with AISR exist to position sensors for the collection of threat signatures. Army intelligence requires platforms that can survive, suffer attrition at an acceptable rate, or exist for one-time use (expendable). Survivability characteristics include reduced signatures, cyberspace/EW resilience, and a multilayered approach (very low altitude, very high altitude, low Earth orbit, and national technical means of verification).

Sensors: Modernization strategies in the near term must focus on continued improvements in sensor range and resolution to enable intelligence collection in large-scale ground combat operations. Army intelligence should pursue miniaturized sensors capable of pairing with small, attritable, or expendable platforms to gain access to threat signatures. Fielding of advancements in several areas will inform sensor development for future aerial platforms: high-definition electro-optical/infrared, precision geolocation, wideband SIGINT, hyperspectral imagery, light detection and ranging, foliage penetrating, and advanced synthetic aperture radar/moving target indicator radar sensors on airborne platforms. Given the pace of MDO, sensors must operate autonomously using distributed, self-healing mesh networks to aggregate data. Sensors must contribute to

shortening the sensor-to-shooter link and support automatic target recognition, battle damage assessment, and situational understanding.

PED: AISR platforms must leverage Distributed Common Ground System-Army based data refinement and exploitation through semi and fully autonomous information fusion capable of alerting analysts and collection managers of key indicators and warning intelligence. Processing and automated decision-making improvements at the sensor will reduce the cognitive load on sensor operators and PED analysts. Continuous refinement of automation of data analysis and machine learning will drive development of artificial intelligence.

Network/Architecture: The Army built and fielded its mission command network in an unopposed environment. The result was a network vulnerable to cyberspace, electronic, and physical attack when facing a peer threat in large-scale ground combat operations. Future investments need to provide redundant, resilient communications capabilities and computing hardware configured to synchronize data when the network is available. Ongoing development of open-architecture, software-defined SIGINT and multi-intelligence sensors compliant with established standards to support cooperative mission applications (for example, theater net-centric geolocation) will facilitate interoperability and flexibility through expeditious responsiveness to threat tactics, techniques, and procedures. Upgrades to the existing fleet and enduring capabilities must include technologies to provide assured position, navigation, and timing through the incorporation of precise alternatives to the Global Positioning System.

U.S Army Graphic

A collaborative effort between Army researchers has resulted in a tool that will enable the Army to model, characterize, and predict the performance of current and future machine learning-based applications on mobile devices. The soon-ending Network Science Collaborative Technology Alliance made this effort possible.

SIGINT/EW/Cyberspace Integration: Cyberspace and EW capabilities will continue to provide low cost alternatives to mitigating traditional U.S. advantages. Incorporation of cyberspace/EW effects delivery capabilities into SIGINT sensors will encourage synchronized operations to capitalize on windows of opportunity in positions of advantage. AISR collection data must propagate throughout national to tactical intelligence in standardized data models discoverable by multiple echelons.

Mid-Term Solution Strategy (2026 to 2035)

The following is the mid-term solution strategy.

Platforms: The manned AISR fleet will transition from vulnerable platforms to survivable ones, in part through incorporating a full suite of advanced, effective aircraft survivability equipment. Future aircraft operating in large-scale ground combat operations will need to specialize in one of two ways: (1) runway-independent, close-area deployable or (2) long-endurance, heavy payload.

Improved and alternative propulsion methods will incorporate runway-independent capabilities to permit Army AISR to operate at the speed of maneuver in an environment where forward arming and refueling points and main command posts are increasingly mobile. Dispersed, forward operation of aerial assets would capitalize on positions of relative advantage to launch and collect with minimal travel to target and limited distance from refuel.

Networked, groups 1 and 2 UAS will develop greater endurance, autonomy, and interoperability, enabling maneuver element employment in support of all warfighting functions. Historically limited to "over-the-hill" reconnaissance missions, future UAS will possess miniaturized sensors with sufficient resolution to support situational understanding. A swarm of terrain-sensing, autonomous, small UAS launched by disparate maneuver elements will optically, aurally, and electronically sense and define the battlefield. Individual swarm elements will carry varied sensors, each providing a portion of the data necessary to reveal enemy position and intent. Autonomous communications UAS will provide a robust, composite self-healing network to feed collection to tactical analysts.

Advancements refined and fielded in the mid-term will transition Army AISR into an expedient, versatile fleet prepared to integrate runway-independent aircraft and automation into formations. This future force will execute comprehensive joint operations to provide real-time situational understanding to every echelon of Army forces.

Sensors: Adaptation and standardization of sensor payloads and mitigation of size, weight, power, and cooling constraints will enable maximum versatility from a single or pair of airframes. This would be better than developing unique aircraft for a specific discipline or capability. Interchangeable, interoperable, networked sensor packages will permit a single airframe to fulfill the full spectrum of intelligence collection possibilities. These universal sensors will include or interface with onboard, automated intelligence processing capabilities to reduce data transmission requirements and perform autonomous tipping and cueing. Advances in quantum imaging/sensing and quantum computing have the potential to significantly improve imaging sensitivity and data processing.

PED: At the command post, network-enabled automated PED will parse and format data while simultaneously conducting autonomous fusion and feeding the common operational picture. Artificial intelligence assistance to intelligence analysts will permit prompt determination of threat courses of action and hasten targeting cycle iterations. Data output will adhere to established inter-Service, multi-organizational, multinational common data models permitting immediate data discovery and enhanced collection utility. This refined information will expeditiously feed into mission command and fires networks to facilitate operations and planning.

Network/Architecture: The family of systems associated with the Multi-Domain Sensing Systems (MDSS) will include functions beyond offloading of collected information. Incorporation of command and control network functions and sensor-to-shooter linkages will elevate the aerial layer into a central role facilitating data exfiltration and availability at all echelons. Expansion of capability in this category will include improved accessibility to and interoperability with joint, interagency, and multinational partner data networks and unit communications. In addition to data and network standardization, this is accomplished through an expeditionary constellation of aerial-based information relay nodes capable of deep fires area penetration in support of multi-echelon and multinational operations.

SIGINT/EW/Cyberspace Integration: Sensors will support integrated SIGINT, EW, and cyberspace in order to sense and exploit a larger array of threat signatures. Sensors will capitalize on modernization and miniaturization of antenna along with supplementary technologies to collect on a major portion of the electromagnetic spectrum. Advancements will enable collection on unintentional radiations of electromagnetic energies and allow simultaneous collection and contribution to network operations. Integrated sensors will perform automated high-speed scanning, detection, and geolocation augmented by data fusion at the point of collection capable of leveraging joint or Army sensor data to provide near real time situational understanding and targeting information to shorten the kill chain. MDSS capabilities provide intelligence support to offensive and defensive electronic attack to achieve deny, degrade, disrupt, deceive, destroy effects against communication and noncommunication targets in accordance with cross-domain fire engagements. Incorporation of cyberspace capabilities into SIGINT/EW sensors allows for the mapping of adversary cyberspace (physical network, logical network, and cyber-persona layers) and identification of capabilities and vulnerabilities of the adversary's cyberspace infrastructure.

DOTMLPF–P Findings

The summarized DOTMLPF–P recommendations listed on the next page are dependent on implementation of the aforementioned materiel solutions captured within the MDSS initial capabilities document.

U.S. Army photo illustration by Peggy Frierson

Cyber-Electromagnetic Activities, or CEMA, teams are now routinely operating with brigade combat teams at combat training centers and during home station training.

Doctrine.

- Doctrine must adapt to account for the expanded range of AISR systems and missions, and incorporate operational lessons learned.
- Incorporating MDSS capabilities will require descriptions of the roles and responsibilities associated with information collection outside of the medium altitude.
- New or improved platforms and sensors will require development of fundamental principles and tactics, techniques, and procedures for Soldiers and leaders to understand how systems within MDSS collect, maneuver, and survive.
- Doctrine must also outline the conduct of AISR-associated PED and the processes associated with integrated capabilities.

Organization.

- Force design updates may be necessary to ensure optimal organization of future force AISR equipment, maintenance, and personnel. These updates may also provide for expanded, organic ISR capability at the division level.
- Force design updates should address the number and type of personnel required to support AISR. The right leaders to plan and execute missions in the complex low Earth orbit, high-altitude, and low-altitude environments are essential.
- The organizations involved require adaptability and self-sufficiency to capitalize on windows of opportunity in expeditionary operations while operating in a joint environment. Central to this idea is the assignment of sufficient equipment and maintenance to provide organic ISR capabilities to the MDO unit of action—the division.

Training.

- Capability and materiel developers must design effective training tools as critical components of MDSS. New equipment training, technical inserts, and materiel upgrades must occur at institutional, home station, and combat training center venues.
- Training will require the replication of MDO environments and must accommodate a sustainable progression of individual skills and collective tasks. MDSS will dramatically increase the necessary level of Soldier proficiency at all levels.
- Analysts and operators must understand academically challenging scientific, technological, engineering, and mathematical principles to pilot, direct, and maintain the platforms, sensors, and networks associated. All training domains will need to incorporate advanced concepts into training at all levels.
- Integration of SIGINT, EW, and cyberspace affects the institutional training of all personnel. Increased emphasis on the electromagnetic spectrum and the cyberspace domain, including the development of Army aerial EW programs of record, levies a force-wide training requirement. The global rise of cyberspace-enabled sensors and systems increases the need for integration of friendly and adversary cyberspace considerations into training.

U.S. Army photo illustration

By 2025, airspace over future battlefields will be extremely congested and potentially dangerous.

Materiel.

- Among the solutions are upgrades to the survivability and performance characteristics of the existing manned and unmanned platforms.
- Advancements in the security of aerial transmissions are required to prevent enemy disruption or interception of information collection.
- Existing aerial sensors also require upgrades to improve attributes of interoperability, range, resolution, onboard processing, and reduced bandwidth transmission.

- The subsequent increase in information collected will require additional processing power and bandwidth for PED elements at all echelons.

Leadership and Education.

- Professional military education will require updating to ensure leaders understand MDSS capabilities and employment.
- Leaders associated with AISR collection and command and control need a sound foundational understanding of AISR capabilities and aerial information collection. This should include an understanding of the strengths and weaknesses of platforms, sensors, and networks in varied environments, including disrupted, intermittent, and limited.
- Leaders will also require an understanding of the personnel, equipment, and organizational implications of integrated SIGINT, EW, and cyberspace.

Personnel.

- As Army AISR transitions to a more MDO-capable fleet, expect updates to intelligence military occupational specialty (MOS) requirements to ensure personnel have the relevant skillsets and professional competencies.
- Some capabilities described in the MDSS initial capabilities document, such as high-altitude platforms and low Earth orbit satellites, may need an entirely new MOS to operate. Others demand specific skills underdeveloped or absent in the force, such as PED of advanced spectral imagery or operation of a quantum illumination detection and ranging sensor.
- MOS 353T (Intelligence Systems Integration and Maintenance Technician)/35T (Military Intelligence Systems Maintainer/Integrator) assignments and skills must expand to integrate new technologies into the network and the AISR fleet. These personnel need the expertise to troubleshoot and maintain sensors and platforms relying on highly advanced technologies and materials in expeditionary environments.

Facilities.

- Fielding of new systems may require updates to home station training and PED reach facilities to support MDO AISR capabilities.
- Launching and recovering low Earth orbit satellites and high-altitude platforms, such as lighter-than-air, will require facilities with the appropriate area and equipment. Other platforms, such as high-altitude UAS, could operate from existing facilities.
- To use artificial intelligence and machine learning to enable global PED, the Army must construct data centers capable of processing and storing the speed and amount of data expected by MDSS capabilities. This will require at least one data center to support the PED of aerial information collection.
- Army training ranges need the ability to manipulate the electromagnetic spectrum to accurately replicate contested, congested large-scale ground combat operations.
- Soldiers and systems need realism in training to gain proficiency and verify the operability of integrated SIGINT/EW/cyberspace aerial capabilities.

Policy.

- MDSS has significant potential to expand Army ISR into traditional Air Force domains such as space. This may require policy adjustments regarding the de-confliction of airspace and command and control processes. As the Army considers alternative operational altitudes for AISR, it must ensure the platforms adhere to inter-Service policy. The fiscal investment in nontraditional platforms associated with MDSS should not culminate in a concept or system that the Army will not operate.
- MDSS will require interoperability to enable multidomain command and control in joint environments. Whether data is direct from the aircraft or disseminated by the intelligence community, AISR data needs to reach the appropriate organic and joint echelon. The information collected must transfer in near real time to data sources available to as many intelligence and warfighter consumers as possible, including unified action partners.

Conclusion

Major findings from the next generation AISR DOTMLPF–P study and other supporting studies and analyses conclude that AISR requires platforms that can survive, suffer attrition at an acceptable rate, or exist for one-time use (expendable). Survivability characteristics include reduced signatures, cyberspace EW resilience, and a multilayered approach (low-altitude, high-altitude, low Earth orbit, and national technical means of verification). Army intelligence must also field sensors that can collect modern signals, sense deep, integrate with cyberspace/EW, and offer flexible platform options.

AISR modernization and the transition to MDSS will require some sustainment of the current AISR fleet in the near term, to service ongoing operations and provide a developmental bridge. To achieve the goal of the modernization of AISR through the MDSS model, a number of efforts incorporating every warfighting function must occur.

Several interdependency implications to the next generation AISR operating concept are outlined in the DOTMLPF–P study. Many include working in conjunction with partner capability developers in order to leverage their platforms and capabilities. The traditional Joint Capabilities Integration and Development System process for the development of an initial capabilities document must lead a successive series of capability production documents to address the vast number of complex issues and unique capabilities. Where applicable, the rapid prototyping and fielding outlined by the Army Futures Command should accelerate the implementation of more mature technologies.

Endnote

1. DOTMLPF–P: doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy.

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Analysis Lessons Learned the Hard Way

by Mr. Chet Brown, Chief, Lessons Learned Branch

The nation that will insist upon drawing a broad line of demarcation between the fighting [person] and the thinking [person] is liable to find its fighting done by fools and its thinking by cowards.

—Lieutenant General Sir William Francis Butler, 1838–1910
Irish, British Army officer, and historian

Introduction

The "so what" of this quarter's column is to share lessons learned from successful intelligence professionals to help inform you of some pitfalls to avoid and some best practice techniques to consider when performing intelligence analysis. The wording of the lessons may differ from U.S. Army doctrinal descriptions and be less elegant than in a host of cognitive psychology publications. The frank section headings are intentional to support long-term retention of the information and its application. These lessons and best practices come from successful operations or intelligence leaders and staff personnel. The sources of these lessons include an Army specialist operating an intelligence terminal in a joint operations center during "the surge" in Afghanistan, a brigade commander mentoring an S-2 during a combat training center rotation, and a general officer mentoring future military intelligence (MI) personnel receiving professional military education.

Read

MI professionals graduate their respective training courses possessing a baseline of knowledge and skills. Successful analysts build upon their initial knowledge, skills, and abilities through continuous self-development to improve the speed, accuracy, and reliability of their analytical conclusions. To become a good analyst, you have to read and be conversant in Army, and often joint, doctrine. It is okay to admit that we do not read as much doctrine as we should. I often begin lessons learned discussions with large groups of MI professionals by asking for a show of hands from those who have read the Army's foundational doctrine for operations, fires, and intelligence. While more hands are raised at the mention of *intelligence* doctrine, it is *operations* that most depends upon our analysis. Intelligence support to operations remains our paramount focus at the tactical level. Doctrine provides the foundation upon which we form and provide the results of intelligence analysis to the commander, regardless of operational level or echelon. For those serving as analysts in specialty or functional organizations (aviation, artillery, air defense, cyber/signal, sustainment, military police, etc.), you should understand the doctrine of the warfighting functions you support. A general officer exemplified the importance of this lesson by challenging a room full of MI field grade officers to understand operations doctrine better than the operations officer. Doctrine also provides the key to understanding the Army's universal language codified in its operational terms and military symbols. At the next lessons learned engagement, I hope to see an oasis of raised palms when I ask who has read ATP 2-33.4, *Intelligence Analysis,* dated 10 January 2020.

Doctrine is Just a Start

The preface of ATP 2-33.4 advises readers to understand the content of several additional doctrinal publications. The recommendation is only a foundation on which to build. Just as one cannot expect to score the maximum on the Army Combat Fitness Test by relying only on unit physical training, superior analytical performance requires additional individual effort. Reading is a form of cognitive training. Intelligence analysts at varying echelons recommend reading *Psychology of Intelligence Analysis* by Richards J. Heuer, Jr.[1] Your peers also recommend reading the quarterly *Military Intelligence Professional Bulletin* (MIPB) to learn from the experiences of others. MIPB provides a platform in which the practitioners of our craft share their insights, lessons, and best practices. If you are disinclined to read or are saddled with a long daily commute, there's always the option of listening to doctrine from a selection of Training and Doctrine Command audiobooks or video books available online through the multimedia resources of the Combined Arms Center.

Don't Believe Everything You Read

This does not contradict the analysis lesson learned encouraging you to read. This lesson is only to remind you to evaluate the myriad of information sources you will integrate into your analysis. I direct you to the intelligence analysis process described in Chapter 2 of ATP 2-33.4. The concise description of the intelligence process phases and the table, which presents source reliability and information accuracy ratings, support multiple lessons and best practices leaders and Soldiers report to us. Intelligence analysis doctrine describes an effective and efficient procedure to associate a degree of confidence with a piece of information.

The tactical operations corollary to "Don't believe everything you read" is the axiom that the first report in contact (with an enemy) is always wrong (inaccurate). The following lesson is from a counterinsurgency veteran who decried the Army's use of the (abandoned) term *low intensity conflict*. The officer, serving as an infantry division G-2 at the time, was firm in the belief that a conflict was no longer low intensity the instant a single bullet was fired in your direction. His point, and lesson for us, is that one's perspective changes with the conditions one experiences. Some suggest that the more potentially lethal the environment, the more likely the effect on initial contact reports. The former G-2 once had to react to a report from a usually reliable reconnaissance element of an enemy self-propelled artillery battery position located much closer to friendly positions than originally thought probable. The artillery battery not only moved an extensive distance from its last reported position, but it also crossed a major river undetected. No reports identified the presence or movement of bridging or watercraft. The G-2 was able to clarify the situation through additional collection and analysis. The vehicles that were reported as tracked self-propelled artillery were actually lightly armored amphibious tanks with their main guns stowed in the traveling configuration.

Headlines, titles, section headings, and other identifiers often serve as clickbait to spur a purchase or make an intelligence product stand out in a sea of other intelligence products. Should we believe these attention-getting labels? As intelligence professionals, we must also consider the motivation behind the producer of the information we use in analysis. What is the originator's intent? Why is this information available to us? What is the perspective of the collector or reporter? Why is this information important? Accepting information at face value, even from government sources, may lead to analytical errors. Are we able to determine the source's past performance in terms of reliability and accuracy? Does past performance indicate current conditions? Are classified sources of information more credible than unclassified sources? This is a lot of information to consider when evaluating tactical intelligence reports, but we have to do it. Following the process in ATP 2-33.4 will helps us evaluate intelligence reporting at the fast pace expected in large-scale ground combat operations.

U.S. Army photo by Dan LaFontaine, PEO C3T

Assistant product managers for Project Manager Mission Command review the common map for the Command Post Computing Environment, or CPCE. The CPCE will help facilitate the military decision-making process for commanders and staff.

Avoiding Confirmation Bias

Confirmation bias is an occupational hazard that S-2s and intelligence analysts must consciously avoid. We put so much time, effort, and intellectual energy into performing analysis that we often forget the enemy gets a vote. We can avoid confirmation bias by recommending reconnaissance and surveillance tasks to identify an absence of evidence relevant to, or indicators supportive of, the developed enemy courses of action. We must rely on self-discipline to combat confirmation bias when screening intelligence reports. A former division all-source intelligence analysis section leader reported falling victim to confirmation bias during a warfighter exercise. The analyst attributed reports of enemy armored forces marshaling in an urban area to faulty reporting. Several things blinded him from seeing the accuracy of contradictory intelligence reports: his focus on supporting the subordinate brigades' close fight, previous command post exercises conducted in preparation for the warfighter exercise, and the firm belief the enemy's only potential courses of action were limited to those identified

during intelligence preparation of the battlefield (IPB). The reporting he had discounted comprised the initial reports of what would become the division's deep fight. The analyst was alerted to the analytical pitfall only through the mentoring of the warfighter exercise cadre. As a result, when he was scheduled to be sleeping, the analyst reviewed and integrated into the division's analysis process each of the disregarded reports in the manner he should have done initially. The revised analytical conclusions led to a time-compressed military decision-making process (MDMP) to address the emerging threat.

All great [leaders] are gifted with intuition. They know, without reasoning or analysis, what they need to know.

—Alexis Carrel, 1873–1944
Nobel laureate in Physiology or Medicine

We must remain vigilant to confirmation bias in everything we use in our analysis (print, broadcast, chat, tweets, etc.). Please review Alexis Carrel's quote above. Do you agree with his conclusion? I did when I first read it. It aligns with a Project Warrior[2] officer describing how a brigade commander defeated the opposing force (OPFOR) at a national training center rotation. The national training center OPFOR has garnered the reputation of being undefeatable, at times believed to be able to dominate the rotational training unit (RTU) at will. It is a significant achievement for an RTU commander to prevail against the OPFOR. The Project Warrior officer attributed the RTU brigade commander's success to his forcing the OPFOR to react to his actions, preempting his force from having to react to the OPFOR. The speed at which the RTU commander directed the tactical operations resulted in the brigade operating inside the OPFOR commander's decision cycle, as John Boyd instructs (observe-orient-decide-act).[3] The brigade commander directly consumed intelligence reports and directed his forces through a series of mission orders unencumbered by waiting for his staff to provide the iterative results of IPB and MDMP.

The commander received and processed information and then reached an analytical conclusion alone more quickly than the subordinate staff elements were able to achieve collectively given the same sources of information. Did the commander rely only on intuition as Carrel states? I think not. Let's change Carrel's quote to something I think is more accurate by removing the phrase between the commas and merging two sentences into one: "Good commanders know what they need to know." Commanders identifying what they need to know become the commander's critical information requirements. The overall intelligence effort is charged with answering the priority intelligence requirement component of the commander's critical information requirements. IPB and MDMP provide the reasoning and analytical conclusions to determine what leaders and staff personnel need to know. It is not what we ***feel*** that is most important as Carrel attributes to intuition. It is what we ***think,*** estimate, anticipate, confirm, deny, seek, refute, conclude, and apply that is the key to success. The most important verb in this list is the last one**—*apply*.** We must apply what we think to drive action.

"What Do You Think, S-2?"

The most simple yet strongest demonstration of a battalion or brigade commander's trust in the unit's intelligence officer is when personnel in the command post pause to hear the response to, "What do you think, S-2?" Every intelligence professional regardless of rank, component, or position should be prepared to answer the question, "What do you think (fill in the blank)?" When leaders and staff personnel at the tactical level seek and incorporate your analysis of the enemy, terrain, and weather into the unit's plans and operations, you are doing a great job. You know you are a member of the commander's "circle of trust"[4] when asked to comment on the full range of the unit's mission or operational variables.

Multiple sources credit retired GEN Colin Powell with issuing the following guidance, which numerous commanders

Photo by Mr. Brian Hill (Leonard Wood)

Officers of Fort Leonard Wood's Maneuver Support Battle Lab discuss their creation of the Analytics User Interface Model, an Excel-based platform that provides commanders with descriptive, predictive, and prescriptive analytics.

have repeated to their respective intelligence officers: "'As an intelligence officer, your responsibility is to tell me what you know. Tell me what you don't know. Then you're allowed to tell me what you think. But you always keep those three separated."[5] I cannot think of a better example demonstrating the importance of clarifying the results of analysis into what we know to be true, what we think may be true, and what we estimate might happen. The full responsibility of assessing and weighing the risks associated with decision making rests solely on the commander's shoulders. Our analysis helps the commander assess and determine the amount of risk to accept. Remembering GEN Powell's guidance helps us separate the results of our analysis to facilitate the commander's decision making.

The Duck Test

Multiple intelligence professionals report the Duck Test being drilled into them throughout their careers. It's a nod to Ockham's razor. (The spelling of *Ockham* appears in various forms should you choose to take the Google route to enlightenment.) I remember Ockham's razor as the simplest explanation is often the most likely to be correct. I also remember the frequent retort of an infantry division G-2 when receiving multiple reports indicating—but not yet confirming—an anticipated enemy action, "If it looks like a duck, swims like a duck, and quacks like a duck, then it's probably a duck."

The other side of the Duck Test and the potential to be swayed by confirmation bias is the healthy dose of skepticism most intelligence analysts possess. Each of the previous analysis lessons learned comes with an inherent intellectual friction. Can determining what the enemy is doing, or will do, be so readily available to us as the Duck Test suggests? Intelligence analysis is never binary. The answer is never black or white; there will always be a shade of gray. Even the nascent aspects of artificial intelligence conducted in the domain of zeroes and ones are only capable of informing what happens in the gray area. The most important gray, however, is the gray matter between our ears. We operate in this gray-tinted cognitive friction zone. When does the continuous consideration of questions become counterproductive? Is the threat force so emboldened or unsophisticated that we can accept at face value the indicators being reported? No, analysis is never this easy. The threat must be hiding something from us. What are we missing? These are reasonable doubts that if left unchecked could lead to the destructive cognitive malfunction of analysis paralysis.

Paralysis by Analysis[6]

Personal observation, reading, and experience allow me to declare that the intelligence resources available to the current force have increased tremendously, as has the complexity of performing intelligence analysis. Collecting and analyzing information on an enemy who seeks to hide their true intentions and capabilities has been, and will remain, a challenge for the intelligence warfighting function and the MI Corps. Analysis was difficult to perform in the legacy force because we did not have enough information. We had fewer intelligence collection capabilities, resulting in scarce critical information to analyze.

By applying legacy force lessons to current and future force operations, we can take steps to avoid paralysis by analysis. We can expect, and therefore plan, to mitigate the effects of being overwhelmed by information. Sometimes so much information is available to us that we lose focus of what is most important. This can lead to believing every intelligence product is important. We believe the "golden nugget" holding the key to the enemy's plan is sure to be embedded within a single report. We might miss the report if we do not personally review each message, product, or radio transmission. We fail to triage information and resort to scouring every report with equal intensity and focus. This approach wastes time and effort and takes us away from other tasks of equal or more importance. A senior intelligence observer coach/trainer (OC/T) recommends establishing, training, rehearsing, and managing the analytical effort and process by delegating roles, tasks, and functions to differing elements or positions. Notice the absence of delegating tasks to individuals by name. Talent management is important when building your analytical team, but you cannot rely on the personalities to be in the appointed positions during operations or training for the duration of an operation. Codifying the actions and responsibilities by position and sections, teams, or elements enables the system to continue operating should any personnel be unavailable.

The OC/T knows the S-2/G-2 has established and is managing an effective intelligence operation when observing the senior intelligence officer walking around the command post or intelligence support element with one hand in a pocket and the other grasping a coffee cup. It is clear to the OC/T that the officer is not attempting to do every intelligence task; rather, the officer is overseeing and guiding the intelligence complement. They are leading the subordinate leaders who are leading their respective teams. The violation of AR 670-1, *Wear and Appearance of Army Uniforms and Insignia,* notwithstanding, the officer is also leading by example in empowering subordinates while remaining fully involved in managing the intelligence effort. The decentralization of roles, responsibilities, and tasks is more likely to prevent the occurrence of paralysis by analysis.

Steps for preventing and overcoming paralysis by analysis

Paralysis by analysis is more likely to occur when an individual takes on the responsibility for the entire analytical effort. Multiple OC/T personnel from the differing combat training centers report this phenomenon usually affects an S-2, an MI captain, or a warrant officer. These professionals will drive themselves to exhaustion attempting to analyze the overwhelming amount of information received. When these MI professionals reach their cognitive culminating point, it provides the perfect opportunity to mentor the unit on the importance of sleep plans, standard operating procedures, delegation, and teamwork. The mentorship also establishes the importance of preparing at home station by training for the speed, volume, complexity, and ambiguity of reporting expected to occur in the multiple domains of large-scale combat operations.

Don't Fear the Black Swan[7]

Stuff happens. As discussed in avoiding confirmation bias, the enemy gets a vote. We may find that while our procedures and processes are sufficient, the enemy may do something unexpected. Sometimes a black swan appears. Our analysis that results from performing every step in IPB, MDMP, targeting, and intelligence analysis processes may turn out to be wrong. Former OC/Ts and brigade combat team S-2 leaders offer that the first and most important lesson from making the wrong call is to continue the mission. Don't obsess over a (mis)perceived failure. Revise the appropriate aspects of the intelligence operation and drive on. You may have to recommend changes to the information collection plan, revise the estimated enemy courses of action, recommend new priority intelligence requirements, etc. Identify the potential impact of changes to intelligence synchronization. Correct errors in the intelligence processes, roles, responsibilities, or functions as soon as time is available without compromising intelligence support to the current operation or phase. A comprehensive standard operating procedure reference enables leaders to make changes on the fly to provide a working aid for those adjusting to the changes.

Conclusion

The commanders we support are skilled, knowledgeable, and capable. They are imbued with the wisdom attained through study and experience. They are proficient in IPB and are familiar with a variety of intelligence sources, methods, and capabilities. Commanders will place their trust and confidence in you and the MI professionals you lead to provide timely, accurate, and relevant analysis. Maneuver and MI leaders share these final pieces of advice when the inevitable analytical mistake occurs: 1) shake it off and drive on and 2) don't let it become a habit.

Epigraph

Colonel [later Lieutenant General] Sir William F. Butler, *Charles George Gordon* (London: Macmillan, 1891), 85.

Endnotes

1. Richards J. Heuer, Jr., *Psychology of Intelligence Analysis* (Center for the Study of Intelligence, Central Intelligence Agency, 1999).

2. Project Warrior is a program in which company grade officers serve as observer coach/trainers at combat training centers. They then instruct professional military education at the U.S. Army centers of excellence, primarily at captains career courses.

3. Robert Coram, *Boyd: The Fighter Pilot Who Changed the Art of War* (New York: Little, Brown, 2002).

4. *Meet the Parents,* directed by Jay Roach (2000; Universal City, CA: Universal Pictures).

5. Tim Weiner, "The Long View, Pssst: Some Hope for Spycraft," *New York Times*, December 9, 2007, https://www.nytimes.com/2007/12/09/weekinreview/09weiner.html?_r=2&oref=slogin&pagewanted=all&oref=slogin.

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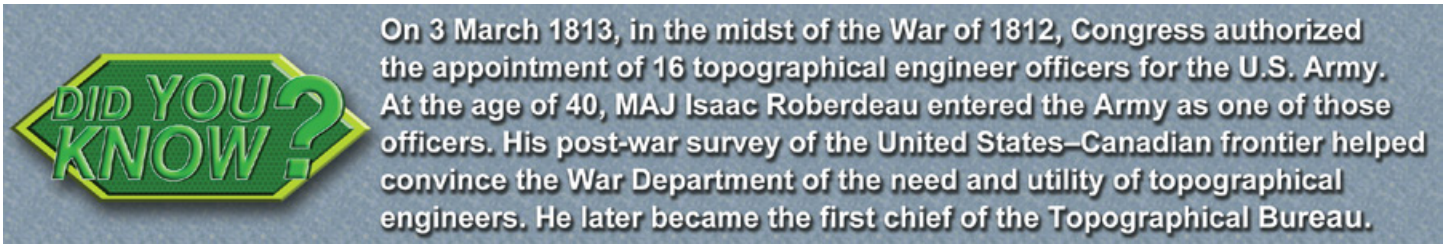

Why Culture Matters for Large-Scale Ground Combat Operations: History, Culture, and the U.S. Military

Culture Corner

by TCC Training Specialist/Developer Keith B.

In war nothing is more important to a commander than the facts concerning the strength, dispositions, and intentions of his opponent, and the proper interpretation of those facts.

—President Dwight D. Eisenhower

War is inextricably tied to the populations inhabiting the land domain. All military capabilities are ultimately linked to land and, in most cases, the ability to prevail in ground combat becomes a decisive factor in breaking an enemy's will. Understanding the human context that enables the enemy's will, which includes culture, economics, and history, is as important as understanding the enemy's military capabilities. Commanders cannot presume that superior military capability alone creates the desired effects on an enemy.

***—ADP 3-0,* Operations**

Introduction

The term *military cultural awareness* usually conjures up thoughts of key leader engagements, civil affairs, the winning of hearts and minds, counterinsurgency operations, international partner relationships and communication, and other such endeavors of military importance. However, even in the bloodiest, most violent large-scale ground combat operations, the cultural awareness of our enemies and of ourselves plays a key role on the battlefield. Take for example some hard lessons the Axis Powers learned in World War II and the United States experienced during the Korean War.

Japan

Before World War II, members of the Japanese high command saw a strongly isolationist United States as greedy and preoccupied with making money. They did not see the behaviors and norms that indicated a sense of honor among the American people, similar to that of the Japanese. They also vastly underestimated Americans' sense of pride and their anger over the bombing of Pearl Harbor. The Japanese thought a quick strike against the United States fleet at Pearl Harbor and subsequent operations would cripple our military enough to force us to the negotiation table, effectively leaving Japan to pursue its interests in Asia.

Dominate Phase of Joint Operations

The dominate phase focuses on breaking an enemy's will to resist or, in noncombat situations, to control an [operational environment] OE. **Success in the dominate phase depends on overmatching enemy capabilities at the right time and place.** Operations can range from large-scale combat to various stability activities, depending on the nature of the enemy and the OE. Dominate phase activities may establish the conditions to achieve strategic objectives early, or they may set the conditions for transition to the next phase of the operation.

—FM 3-0, *Operations*[1]

Instead, the Japanese high command's lack of cultural awareness left senior officers lethally underestimating the situation. They did not realize how quickly and dramatically a perceived sneak attack would channel a generally isolationist-leaning American public's peacetime pursuits (even if America was already ramping up military production with the Lend-Lease Act and other initiatives) into a colossal wartime mobilization and an angry desire for decisive retribution.

Lend-Lease Act

The Lend-Lease Act stated that the U.S. government could lend or lease (rather than sell) war supplies to any nation deemed "vital to the defense of the United States." Under this policy, the United States was able to supply military aid to its foreign allies during World War II while still remaining officially neutral in the conflict. Most importantly, passage of the Lend-Lease Act enabled a struggling Great Britain to continue fighting against Germany virtually on its own until the United States entered World War II late in 1941.[2]

Photo courtesy of Wikimedia Commons

United States President Franklin D. Roosevelt, British Prime Minister Winston Churchill, and their advisors meet to plan the Allied European strategy for the next phase of World War II during the Casablanca Conference in Casablanca, Morocco, January 1943.

Germany

Adolf Hitler wanted to subjugate England, but he also admired its accomplishments—its Empire, its conquests, and its ethnic makeup. Some of his contemporaries said that even after hostilities broke out, Hitler hoped for a measure of peace with Great Britain, although it never could have happened given the British culture. Hitler reflected on this in his Directive No.16 (Operation Sea Lion), 16 July 1940, which described a landing operation against England. In the directive, he wrote, "As England, in spite of the hopelessness of her military position, has so far shown herself unwilling to come to any compromise, I have decided to begin to prepare for, and if necessary to carry out, an invasion of England."[3]

Testimony by World War II-era German officers suggests that Hitler's admiration and willingness to coexist (albeit in a dominant-subservient relationship) with England was a significant factor in Hitler's decision not to pursue a conflict with England with the intensity needed to reach a decisive end. This eventually resulted in Germany having to fight a two-front war. Hitler's lack of understanding of English culture as a whole became apparent when he misjudged England's pre-war support and his interactions with numerous wealthy, powerful English citizens, including the Duke and Duchess of Windsor, believing they would condone his open military aggression that ultimately led to the outbreak of World War II.

By not pursuing England's defeat with the same zeal as it did with other countries, Germany left an isolated England alone but resolute. This in turn allowed the United States to focus on the European theater, as well as a base of operations when it entered the fray. By then, Hitler had turned east to attack Russia, leaving a regrouped England ready to fight on the European continent alongside Americans and other allies on the Western Front while Russia eventually crushed Germany from the East.

On an operational level, cultural awareness might have made a significant difference for the U.S. Army with regard to the Battle of the Bulge. Some have speculated that if the strategic-level leadership had taken into account not only the tendencies of Hitler and his generals but also German culture, especially historic German military culture, it would have resulted in more widespread anticipation and preparation for the Germans' surprise Battle of the Bulge counteroffensive, potentially saving untold lives.

Germany's successful invasion of France and Belgium earlier in the war was a reason for Germany to use the Ardennes Forest once again in their counterattack during the Battle of the Bulge. Given Hitler's and the Nazis' deep association with German mythology, there was also a significant cultural

Photo courtesy of Wikimedia Commons

Brünnhilde the Valkyrie, illustration to Richard Wagner's *Die Walküre*, by Arthur Rackham (1910).

factor in using the forest for Germany's last great attack against its enemies. German culture has always had a close emotional association with the forest—a place seen as representative of true German character and unity, struggle, taming of the wilderness, and ultimately victory. For Hitler, who ordered this counteroffensive to the surprise of his own generals, the use of the forest was in line with his cultural and racial views of how Germany should conduct itself. Military historian Peter Caddick-Adams notes that even the name of the counteroffensive, *Herbstnebel,* which means *Autumn Fog,* has connotations of extremely influential and popular German mythological operas by Richard Wagner, who made extensive use of the mythological German forest in his works.[4] Wagner was a favorite composer of Hitler and the Nazi leadership. Wagner was aware of the significance of forests in Teutonic culture and myths. He chose the forest as the primary background for his operas and used fog as a motif to signal foreboding.[5] Indeed, several people in the American military warned of such an attack, but those who heard these warnings did not look at the situation culturally. Instead, they thought that the time, location, and quantitative state of German Army forces made such an attack in the forest extremely unlikely.

U.S. Air Force photo

GEN Douglas MacArthur, World War II hero and first United Nations commander in Korea, with his pilot, Lt. Col. Anthony Storey.

Korea

Some say that a lack of cultural awareness played a role in American GEN Douglas MacArthur not expecting the Chinese to attack United States forces in North Korea in 1950. Nor did he expect them to mount such an effective attack. Many historians believe he did not consider China's cultural willingness (and Chinese leader Mao Zedong's personal willingness) to take large numbers of casualties—even against America, a country with an established nuclear capability. He also did not understand that the still-fledgling communist Chinese government saw the opportunity to solidify its legitimacy and gain prestige by fighting the United States. Several factors may have contributed to GEN MacArthur's mindset. Some think that the general's experience fighting the Japanese in World War II guided his views and expectations of the Chinese during the Korean War, even though these two forces were culturally completely different. One was a conventional army that had aims and strategies limited in part by the shortcomings of its available resources and industrial potential. The other was an army that had found success in a long guerilla campaign. Others cite the lack of cultural self-awareness was due to personal hubris. GEN MacArthur had what many referred to as a sycophantic echo chamber, where people only told him what he wanted to hear, even if it was contrary to the opinions of other military leaders and President Truman's administration.

Current and Future Operations

Even basic cultural awareness can have a tremendous impact on kinetic combat strategy and operations. For example, in World War II, the Soviet Union had a totalitarian, centralized communist party leadership set in the socioeconomic context of a centuries-old peasant-aristocrat culture. This, combined with Russia's history of invaders, flat western plains, and limited access to the seas, should have led the Germans to the accurate conclusion that the Soviet Union would fight a war of attrition that relied on its willingness to sacrifice both people and equipment.

A peer or near-peer adversary engaged in large-scale ground combat operations against the United States will likely apply history and cultural awareness to the fight. Our adversary will have a cultural, historical, and strategic understanding of the force-multiplying power of public perception manipulation in a Western liberal democracy such as ours—one that is generally casualty-averse, pervasively internet-connected, media-informed, and increasingly expectant of instant results. Their priority will likely be to achieve the highest number of U.S. casualties and local civilian deaths, and control of the length of engagements, regardless of territorial or traditional military gains, because of the impact these actions would have on our media and

national morale. And they will also use cyberspace and information warfare to exploit shared cultural norms, historical grievances, friendly political decision making, and other actions of perception management.

It is also likely that adversaries will exploit gaps in U.S. military tactics, operations, and strategy, particularly in our technology and weapons platforms. They will find vulnerabilities, exploitable opportunities, or weak points in our systems. In Iraq and Afghanistan, we were vulnerable to low-tech improvised explosive devices and ambushes from poorly trained, poorly equipped insurgents. We were able to degrade but not eliminate such tactics. Now imagine the tactics and strategies that our peer and near-peer adversaries will use, applying vastly superior training and technology in all the domains.

Conclusion

These are just a few examples of how culture can play a direct, key role in operational and strategic combat operations—not just before or after military engagement but also in the planning and execution of the combat engagements themselves.

Epigraph

President Dwight D. Eisenhower, when laying the cornerstone for the Central Intelligence Agency building, Langley, VA, 3 November 1959, quoted in Department of the Army, Field Manual (FM) 3-0, *Operations* (Washington, DC: U.S. Government Publishing Office [GPO], 6 October 2017), 2-42. Change 1 was issued on 6 December 2017.

Department of the Army, Army Doctrine Publication 3-0, *Operations* (Washington, DC: U.S. GPO, 31 July 2019), 1-4.

Endnotes

1. Department of the Army, FM 3-0, *Operations,* 1-13–1-14; emphasis added.

2. "Lend-Lease Act," HISTORY website, A&E Television Networks, LLC, November 4, 2019, https://www.history.com/topics/world-war-ii/lend-lease-act-1.

3. Dan Cruickshank, "The German Threat to Britain in World War Two," BBC website, last updated 21 June 2011, http://www.bbc.co.uk/history/worldwars/wwtwo/invasion_ww2_01.shtml.

4. Peter Caddick-Adams, *Snow & Steel: The Battle of the Bulge, 1944–1945* (New York: Oxford University Press, 2015).

5. "Symbols in Richard Wagner's *The Ring of the Nibelung,*" University of Michigan website, December 17, 1997, http://umich.edu/~umfandsf/symbolismproject/symbolism.html/Teutonic_Mythology/ringsym.html#Forest.

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Moments in MI History

Forecasting the Bulge: Third Army G-2 in December 1944

by Mr. Michael E. Bigelow, Command Historian, U.S. Army Intelligence and Security Command

In mid-December 1944, LTG George S. Patton's Third Army approached the German border. Over the previous 4 months, the Third Army had advanced from Normandy and pursued retreating German forces across France. On 13 December, Patton's forces had captured the fortress town of Metz in Lorraine, clearing the way for an advance to the Rhine River. Six days later, Patton wanted his army to begin its attack toward Frankfurt.

As the end of 1944 drew near, the Third Army's G-2 section had become a smooth-running intelligence organization. The staff routinely provided situational awareness and developed targets for Patton and his headquarters. It also coordinated the intelligence collection efforts within the Army and exchanged tactical information with subordinate and higher headquarters. At the head of this intelligence staff was COL Oscar W. Koch, who had been Patton's intelligence officer in the North African and Sicilian campaigns.

For the Third Army G-2, all sources of information were important. The Army relied on a wide range of intelligence sources from infantry patrols and prisoner interrogations to signals traffic analysis and aerial imagery. One asset's strength would compensate for another's limitations. If poor weather grounded aerial reconnaissance, the G-2 could gather information from prisoners, signal intelligence, and troops in contact. Sources both complemented and supplemented each other. For example, the 118th Signal Radio Intelligence Company obtained radio frequencies and call signs through interrogation and captured document teams. The result of this all-source effort was a balanced and flexible Third Army collection system.

This balanced collection effort helped Koch accurately keep track of the enemy situation. But more important, his thinking was always clear and detached. After racing across France in August and September, the Allies were optimistic the war would soon end; however, Koch remained cautious. At the end of August 1944, he estimated that despite huge losses, the Germans maintained a cohesive front and had not been routed. He reported that the enemy were still bringing new units into battle, although this did not give them new offensive power. With weather and terrain on their side, Koch believed the Germans would play for time and wage a last-ditch struggle. For the Third Army G-2, the war wasn't over.

COL Oscar W. Koch, a cavalryman, served as LTG Patton's intelligence officer in North Africa, Sicily, and Northwest Europe.

As the Allies approached the German border, German resistance stiffened and the Allied advance slowed to a crawl. Yet optimism remained. Other Allied intelligence officers believed that the heavy fighting was sapping the Germans' strength and that the Germans would not have the force left for an offensive action.

Koch continued to watch throughout the autumn. By the end of October, he noticed the Germans were withdrawing

LTG Patton and his staff during the Battle of the Bulge. COL Koch, on the far right, kept Patton informed of German capabilities.

panzer forces from the front and were building up forces in the Eifel area opposite the First Army, to the north of Patton's Third Army. Because those enemy forces in Eifel could threaten the Third Army's projected offensive southeast toward Frankfurt, Koch paid close attention to them. During November, the Army G-2 planned aerial surveillance of Eifel's railroad marshalling yards and road intersections. Despite poor flying weather, photo interpreters could trace the progress of hundreds of railroad trains carrying armor and vehicles.

During his 9 December 1944 briefing, Koch briefed German strength and capabilities in Eifel. By Koch's estimate, the Germans had nine divisions (four in contact) facing the First Army's VIII Corps. That force was two and a half more divisions in equivalent strength than stood against the entire Third Army. The G-2 concluded that the German divisions could be used to meet threats from the First or Third Armies, divert Allied reinforcements to Eifel, or launch a spoiling or diversionary attack.

Armored forces of the Third Army advance into the flank of the German counteroffensive during the Battle of the Bulge.

Several factors favored the last possibility. The Germans had a tactical reserve of 105 tanks in two panzer divisions in Eifel. Of the nine divisions, the five in reserve were rested and refitted. To support ground forces, the Germans had marshaled 1,000 fighter planes. While the terrain was unfavorable for Allied winter operations, it was favorable to a German offensive.

Based on Koch's briefing, Patton decided to continue the plans for the Third Army operation toward Frankfurt. However, he directed that limited preparations begin to meet the potential German spoiling attack. Later, Patton would use the outline planning to counter a German threat bigger than even Koch had calculated. On 19 December, Patton had his army shift the attack's direction and rip into the southern flank of a 20-division German counteroffensive. By Christmas, the Third Army had relieved the besieged city of Bastogne, a critical road junction, and had driven a salient into the Germans' exposed flank. The tide had finally swung against the Germans.

Patton did not change his offensive plans because Koch briefed him on a potential threat to the north. However, by telling Patton of the potential threat's capabilities, the G-2 started his commander and staff thinking about how to react to such a situation. As a result, the Third Army's rapid and unexpected shift of direction broke the back of the Germans' counteroffensive in the south.

Mr. Michael Bigelow has served as the Command Historian for the U.S. Army Intelligence and Security Command (INSCOM) since 2006. He holds a bachelor of arts in history from Colorado State University and a master of arts in military history from Temple University. He has written numerous articles for military publications such as Military Review *and* Military Intelligence Professional Bulletin. *Before becoming INSCOM's Command Historian, he served as an active duty military intelligence officer for 22 years.*

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