



A Soldier from Charlie Company, 1st Battalion, 27th Infantry Regiment, 2nd Infantry Brigade Combat Team, 25th Infantry Division, conducts tactical movements after having air assaulted to an area near the objective, kicking off a week of realistic training in Hawaii, January 27, 2020. Readiness determines our ability to fight and win our Nation's wars; it is timely and relevant analytical intelligence forecasts of the threat that ensures our future success.

Forecasting the Threat within the Future Operational Environment

by Dr. Elyssa Dunfee, Mr. Ralph Edwards, and Dr. Christopher Beiter

Introduction

The U.S. Army is in a period of intense modernization and change, and it will require changes to intelligence collection, analysis, and dissemination in order to succeed in great power competition now and in the future. This article seeks to identify challenges and opportunities for Army military intelligence (MI) as it pivots to support emerging requirements in this new environment. First, we discuss issues raised by the need to fully integrate intelligence into the overarching context of the future operational environment and the Army modernization enterprise. Next, we highlight three key objectives for Army MI in adapting to these new challenges, and propose systems and processes to enable success in achieving these objectives. We describe how Army MI will emphasize a rigorous planning process to

discover and prioritize requirements, drive a dynamic collection process, and adopt a tailored analytic process. We propose that Army MI should emphasize near-real-time dissemination of analysis of current foundational data via databases supporting the current operational environment and embrace rigorous analytic methods to forecast threats in support of the future operational environment and decisions by Army senior leaders.

Intelligence to Support the Future Operational Environment

The future operational environment drives Army concepts and capabilities, dictating the modernization investments necessary to ensure that the force is adequately developed, trained, and equipped to overmatch the threat in the mid- and far-term. The Army is dependent upon the delivery

of timely, relevant, and integrated all-source intelligence that adequately forecasts the threat aspects of the future operational environment. The National Ground Intelligence Center (NGIC), in collaboration with other mission partners in the intelligence community, and especially the Defense Intelligence Enterprise, is the primary production element responsible for meeting the Army's needs in this regard.

As identified in numerous strategic documents, the United States is entering a period of enduring strategic competition that brings the potential for large-scale conflict as well as coercive activities short of war. During this time, challenges from rogue states and non-state actors will persist. Rapid technological developments will almost certainly change the character of future war, adding profound complexity and uncertainty to the future operational environment. As with the entirety of the U.S. national security apparatus, Army MI must take stock of its role in this new environment and commit to providing superior analysis of the threat in the context of this complex and fluid future operational environment. This will enable future force development and Army materiel modernization efforts.

To provide insightful analysis of the threat in this context, NGIC and intelligence community mission partners must contend with several significant issues:

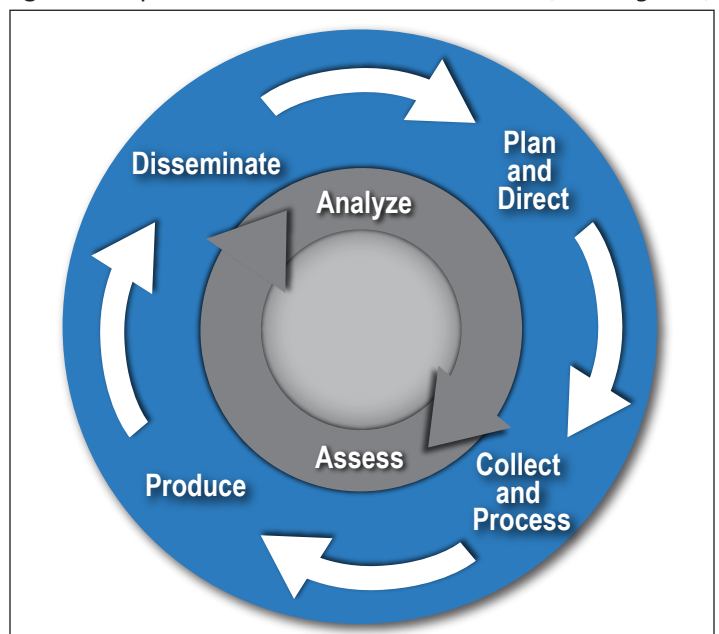
- ◆ The future operational environment affects the future threat and is itself impacted by the future threat, which means that intelligence support to the future operational environment must be agile and mindful of context.
- ◆ We must insist on conceptual clarity in our analysis. Abstract concepts must be defined consistently and used with precision. For example, confusion about what constitutes concepts such as the "competition phase" or "gray zone activities" impedes efforts to assess and clearly communicate conclusions regarding their status and effects.
- ◆ We should carefully consider the relevance of key theoretical insights gained during the most recent period of great power competition. While much has changed in the world since the Soviet era, hard-earned knowledge about issues such as deterrence and the security dilemma, for example, may help us understand the incentives and constraints that shape the future threat.
- ◆ Even with added conceptual clarity, there will always be intelligence topics relevant to the future operational environment that are emergent or defy easy categorization and, as a result, tend to be neglected or fall into seams within and between organizations. NGIC and

intelligence community partners must be vigilant and proactive in identifying these topics—such as the aforementioned "gray zone activities"—and integrating relevant expertise across organizations, if necessary, to present comprehensive analysis to customers.

- ◆ With respect to materiel capability development, detailed intelligence products on the threat are required as early as possible in the life cycle, often when capability parameters are not yet well defined. This situation demands a structured, disciplined approach to forecasting in general, and technology forecasting in particular, as it relates to adversarial applications to military capabilities. To arrive at the best possible intelligence analysis for the benefit of a capability program, managers, developers, and engineers must maintain dialogue with intelligence analysts and levy requirements germane to the program over its entire life cycle.
- ◆ If intelligence requirements are suitably maintained and validated for a program over its life cycle, and integrated analysis is generated as a result, then the concept of threat-based performance can be realized. Cost, schedule, and performance are the fundamental considerations that drive program decision making, and an effective understanding of the threat will allow the program to make appropriate adjustments and acceptable risk determinations to ensure the viability of the program through operations and sustainment.

Prioritizing Requirements

The intelligence process is the process by which intelligence requirements are satisfied. ADP 2-0, *Intelligence*,



The intelligence process¹

defines the intelligence process as composed of the continuous steps of *plan and direct*, *collect and process*, *produce*, and *disseminate*.² While all the steps are necessary for success, the *plan and direct* step offers the most return on investment in terms of maximizing efficiency in the intelligence process in order to meet expanding requirements for intelligence in a flat or decreasing resource environment. Army MI will use the Army Program of Analysis and rigorous prioritization schema to maximize efficiency in the *plan and direct* step of the intelligence process in order to drive Army and intelligence community collection, produce and integrate the most important analysis, and deliver tailored products to the intelligence consumer at the right time.

The Army Program of Analysis is both a process and a document. The document definitively represents Army all-source intelligence needs across the service. The process identifies intelligence requirements and enables prioritization and planning of collection requirements, all-source analysis, and production. Army Program of Analysis developers solicit intelligence requirements from across the Army and sort them according to a set of key intelligence questions approved by Army G-2. Analysts convert the requirements to primary intelligence questions for the purposes of prioritization and production planning. Primary intelligence questions are prioritized in order to best apply available analytic resources and to guide the Army's collection assets in pursuing the most impactful information.

In 2020, the Army Program of Analysis process focused principally on the Secretary of the Army's modernization priority. MI senior analysts selected issues addressing the pacing threat from near-peer nations and modernization efforts that were likely to affect Army Futures Command or Army cross-functional teams. This effort resulted in the down-selection of 12 top-tier priority intelligence requirements from more than 500. NGIC will produce collection support briefs and Army G-2 will produce operational directives to go after this top-tier of collection priorities. Army and intelligence community collectors, as well as the Army and joint hard target programs, will accurately focus on the Army's most important intelligence needs. Likewise, MI will derive a production plan from documented customer

intelligence requirements, which will enable purposeful integration from discrete-level questions up to the broad view required by senior decision makers, force planners, and modernization professionals.

Anticipatory Intelligence

Anticipatory intelligence that forecasts the threat out 15 or more years is critical to making long-term investment decisions, managing risk, and developing the future force. Unfortunately, this requirement frequently creates apprehension for intelligence professionals who must navigate the somewhat incongruous challenges of delivering "accurate" intelligence estimates while adequately conveying the inherent uncertainty of these estimates. Too often, this dilemma leads analysts to err in one of two ways. Those choosing to err on the side of accuracy deliver to customers a well-sourced document that more closely resembles a book report than an intelligence estimate. Those who concede to uncertainty throw their hands up and rely on their expertise to intuit a guess at the "possible" future threat. Neither approach meets the high demands of Army modernization, so how can this be resolved? We make three recommendations:

- ◆ Both analyst and customer must have a **shared definition of forecasting**.
- ◆ Analysts should embrace novel analytic methods, including data science techniques when appropriate, to **add rigor to forecasting**.
- ◆ **Analytic review chains** should view the community analytic standards as a license instead of a constraint and emphasize the distinction between unwarranted judgments and highly uncertain judgments.

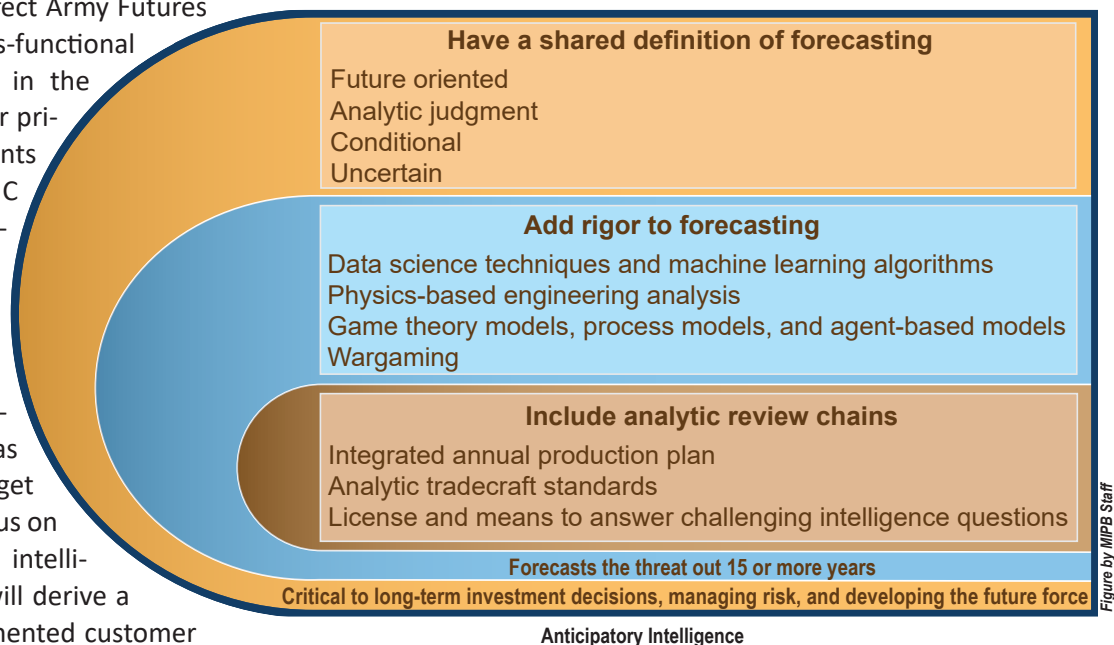


Figure by MIPB Staff

What is a Forecast? For an intelligence professional, to forecast is to provide a future-oriented judgment that is inherently conditional and uncertain. In unpacking this definition, we see four components:

- ◆ **Future orientation** conveys a need to understand a prospective state of the world, but customer and analyst must share a common understanding of the precise type of requirement. Does the customer require a point estimate of future threat capability? The distribution and likelihood of plausible future scenarios? An examination of potentially dangerous wild cards?
- ◆ **Forecasts are analytic judgments;** this means that they are inherently inferential. Waiting for collection to provide the “answer” to a forecasting question is futile and reflects a fundamental misunderstanding of the requirement. Collection is, of course, a critical part of the intelligence process, but a forecast is more than a summary of collected information. The only way to substantiate a forecast is through sound reasoning.
- ◆ **Forecasts are conditional** in that they are built on a foundation of knowledge about the past or present as well as assumptions held constant for the sake of logical argumentation. It is the analyst’s responsibility to make conditions explicit, and it is the customer’s prerogative to question them.
- ◆ **Uncertainty is unavoidable** in forecasts. By virtue of their very ambition, they grapple with the unknowable. Instead of avoiding uncertain judgments, analysts should objectively assess and directly convey uncertainty in their forecasts in order to allow customers to weigh risk appropriately.

How Can Analysts Add Rigor to Forecasts? While traditional intelligence community tradecraft offers a plethora of structured analytic techniques valuable for adding rigor to forecasting, two nontraditional approaches also lend themselves to this challenge, each under a different set of conditions.

For questions that require identifying trends, patterns, or outliers in large amounts of structured or unstructured information, data science techniques and, increasingly, machine learning algorithms, can uncover hidden insights. Notably, these techniques support inductive data exploration, hypothesis testing, probabilistic predictions, and reasoning beyond singular, or small numbers of, observations.

For questions that require making analytic judgments when information is scarce, formal methods provide critical analytic leverage. As with data science approaches, these

methods can be computationally intensive, but they contrast with data science in that they derive conclusions from assumed or established predicates instead of inducing them from large numbers of observations. Methods that fall under this broad category include physics-based engineering analysis, game theory models, process models, agent-based models, wargaming, and a variety of other simulation environments. For example, the discipline of modeling and simulation puts foundational MI data in motion. The Defense Intelligence Enterprise has made a concerted effort to develop and maintain a robust capability to afford customers the ability to conduct high-fidelity, red-on-blue, many-on-many modeling and simulation scenarios for operational planning and modernization design tradeoff studies. As the Army modernizes and develops concepts for executing multi-domain operations, modeling and simulation affords a cost-effective and efficient manner with which to explore various future operational environment conditions and related excursions.

Sound application of these methods, and other novel analytic approaches, will require a broadening of traditional analytic tradecraft training to ensure analysts, analytic review chains, and leaders understand their value and limitations and can communicate the results of their analysis clearly and accurately.

The Art of Review. Senior analysts and others in analytic review chains add value in all steps of the intelligence process, but they primarily focus on the *plan and direct* step and the *produce* and *disseminate* steps. Senior analysts affect the *plan and direct* step by helping to develop an integrated annual production plan in support of the Army Program of Analysis, in addition to supporting rigorous analytic design at the individual production requirement level. The *produce* and *disseminate* steps require senior analysts to review and evaluate intelligence production for analytic quality and to ensure analysis is timely, relevant, and delivered to customers in the right format.

To meet these challenges in an increasingly complex and fast-paced environment, senior analysts and others in review chains would benefit from a shift in perspective with respect to analytic tradecraft standards. Rather than senior analysts viewing intelligence community analytic standards through a lens of *adherence to ends*, we suggest that they adopt a view of the standards as a *license, and a means*, to answer the most challenging intelligence questions.

For example, the community standards should be properly understood as giving analysts permission to make inherently uncertain far-term threat forecasts, as opposed to precluding them. Importantly, senior analysts should

understand, and be able to communicate to customers, the distinction between a highly uncertain, but properly substantiated, judgment and an unwarranted speculation. In good news for Army modernization, analytic tradecraft standards viewed liberally provide the intelligence analyst both license and means to achieve the highly uncertain, but properly substantiated, judgment for answering intelligence questions, while avoiding unwarranted speculation.

Foundational Intelligence

In the Defense Intelligence Agency's (DIA) 2018 *Strategic Approach*, foundational MI is described as "the comprehensive understanding of foreign military capabilities, infrastructure, and materiel."³ This simple, descriptive phrase conveys that foundational MI is a fundamental element for understanding the current threat and a necessary basis for forecasting the threat component of the future operational environment.

Machine-assisted Analytic Rapid-repository System

With the plethora of foundational MI data available across the Defense Intelligence Enterprise, discoverability and accessibility by the Army and other customers is a growing concern. To address this, DIA has launched the Machine-assisted Analytic Rapid-repository System, also known as MARS. MARS incorporates five major foundational MI categories: infrastructure, order of battle, intelligence mission data, cyberspace, and space/counterspace. While MARS will certainly host foundational MI data, it is not simply a "grand foundational MI database" that will subsume all current and future foundational MI datasets. Rather, it will be an interoperable, cloud-enabled environment with dynamic linkages to foundational MI throughout the Defense Intelligence Enterprise. As of this writing, the initial capability offering for the infrastructure portion of MARS is being piloted, and the initial capability offerings for order of battle and intelligence mission data are beginning to take shape. MARS is intended to provide users with the ability to scale intelligence and information, dynamically bring together content, and continuously adapt to new missions. As envisioned, MARS will be a fundamentally important resource for the Army to address the current threat environment and will enable accurate forecasting for the future operational environment.

When describing how MARS will change the way intelligence data is processed and accessed, DIA Director LTG Robert P. Ashley Jr., stated, "MARS is our moon shot...It's those kinds of innovations that we're looking at that allow us to be able to have better situational awareness, have richer information, to be more current, to be agile and dynamic—that is not static databases and that we are constantly updating."⁴

Hybrid Intelligence. Army and Department of Defense intelligence consumers also require intelligence products that forecast future adversary capabilities within the foundational construct. Currently, three intelligence product types address this need for "hybrid intelligence" that builds on foundational MI:

- ◆ Threat modules.
- ◆ Joint correlation of forces assessment.
- ◆ Critical intelligence parameters.

Individual threat modules available in the Defense Intelligence Threat Library combine foundational data on existing systems with projected data for future systems. Likewise, the Joint Correlation of Forces Assessment database contains more than 30 years of order of battle information. Critical intelligence parameters are intended to inform the acquisition community when an adversary has breached a threshold on a particular threat-sensitive performance parameter for a U.S. capability. Including analysis of an adversary's progress along the way will greatly improve the effectiveness of the critical intelligence parameters process. Updates to all three forms of hybrid intelligence occur on a 1- or 2-year cycle.

To make efficient use of analytic resources and to set up our analytic processes for success in answering additional anticipatory questions about the future threat, we make three recommendations:

- ◆ Disseminate foundational MI in integrated databases that enable near-real-time dissemination of analysis of current foundational data to facilitate common access to current data.
- ◆ Leverage enterprise-wide solutions such as MARS (when and where) to enhance both infrastructure and operational efficiencies.
- ◆ Treat parameterized anticipatory data in the same way as current foundational MI to create automated, dynamic availability of data to the acquisition, modeling and simulation, and wargaming communities.

Conclusion

The challenge for NGIC and its intelligence community mission partners is to deliver timely, relevant, integrated intelligence to meet the Army's modernization needs while at the same time fulfilling requirements to support current operations and readiness. A wide range of extant



products can be tailored to improve all-source output in this regard, including foundational MI data, modeling and simulation, hybrid products, and anticipatory forecasts developed through the Army Program of Analysis. Ultimately, all-source assessments that sufficiently address the adversarial aspect of the future operational environment represent the critical analysis upon which the Army will generate threat-based performance as a successful outcome of multifaceted modernization efforts. We have described effective forecasting methodologies that the Army should incorporate into products that serve the Army's force development and acquisition programs. If these ideals can be realized, then the modernized force will be better prepared to prevail in future conflicts. ✨

Endnotes

1. Department of the Army, Field Manual 2-0, *Intelligence* (Washington, DC: U.S. Government Publishing Office [GPO], 6 July 2018), ix (common access card login required).
2. Department of the Army, Army Doctrine Publication 2-0, *Intelligence* (Washington, DC: U.S. GPO, 31 July 2019), 3-2.
3. Defense Intelligence Agency, *Strategic Approach* (September 2018), 11, https://www.dia.mil/Portals/27/Documents/About/DIA_Strategic_Approach.pdf.
4. Robert K. Ackerman, "DIA Aims for MARS as its Moon Shot," *SIGNAL Magazine*, August 15, 2019, <https://www.afcea.org/content/dia-aims-mars-its-moon-shot>.



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