



Intelligence Modeling and Simulation

By Mr. Ryan Wilson and Mr. Gary Phillips

Introduction

Creating a simulation that exercises intelligence processes in support of combat operations is far more complex than modeling ground combat maneuvers. Combat and maneuver modeling benefits from well-understood physics, deterministic outcomes, and systems whose behaviors can be captured with relative precision. The behavior of weapons, from their physical characteristics to their ballistic trajectories, is governed by measurable parameters and established scientific principles, leading to predictable effects.

Intelligence, however, is an entirely different creature. While battlefield activities produce physical, observable signals, interpreting those signals relies more on art than science—thus, the overall intelligence process is widely recognized as a delicate blend of both. It relies on subjective human judgment, where information is always ambiguous, its context is debatable, and its true meaning is filtered through the imperfect lens of the human mind. For instance, a sensor may detect observable data flawlessly—but that data can still be misinterpreted, mischaracterized, or forced into an analytic framework that bends the truth rather than clarifying it. Within a ground maneuver model, a munition hits or misses, and damage is largely deterministic. In intelligence simulations, the “effect” is never binary; rather, it is mediated by perception, bias, inference, organizational culture, and the analyst’s ability to wrestle with incomplete, contradictory, or deceptive information under the pressure of time and consequence. Simulating an intelligence enterprise is therefore not primarily a physics problem. Instead, simulation design must facilitate both the art and the science of the intelligence process. It is an attempt to replicate the ambiguity, friction, bias, inference, and human misinterpretation that defines the intelligence processes in actual practice. An often-used example of this is that of an experienced fighter pilot who

recognizes the unpredictable, human-centric immediacy of real flight, in contrast to a rookie pilot who knows only the “perfect” physics of the simulator. Similarly, seasoned intelligence professionals can recognize when information “feels right,” an intuitive skill developed from deep familiarity with enemy tradecraft. Ultimately, intelligence simulations and models must account for both science and art.

Models and Simulations: Core Definitions

To establish commonality, we must define our core terms:

- ◆ **Model:** “A physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process.”
- ◆ **Modeling:** “A set of rule-based graphical, or text expressions used to communicate the form, attributes, and functions of an object, process, phenomenon, or system.”
- ◆ **Simulation:** “A method for implementing a model over time. Simulation may include live, virtual, or constructive elements as well as supporting frameworks and environments.”¹

Within intelligence modeling and simulation (M&S), models represent the objects and activities associated with directing, collecting, processing, analyzing, and reporting information to support decision-making, including targeting. This requires accurate representation of adversary objects and activities—not just friendly ones—as well as the operational environment that shapes how those activities are perceived and interpreted.

Doctrine, both friendly and adversary, must provide the behavioral foundation for how these objects and activities interact. When this foundation is codified, the simulation can accurately emulate the intelligence products commanders rely on to make time-sensitive decisions.

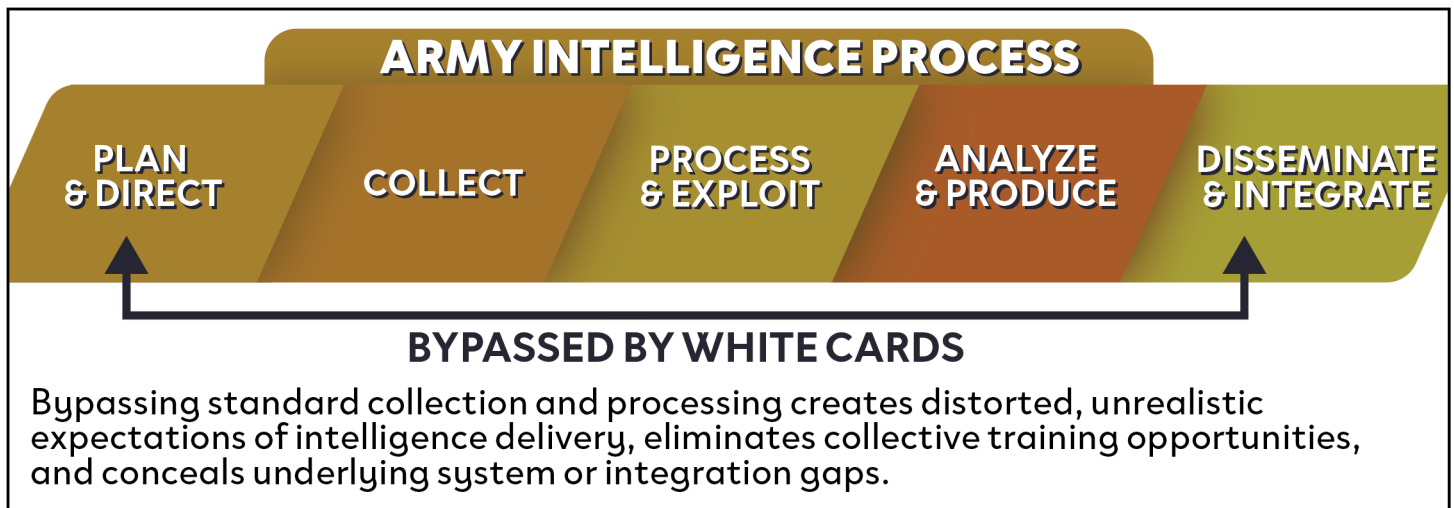


Figure. White Card Capability Gaps

Decades of Fragmentation

For decades the Army has struggled to develop intelligence simulations in a time-constrained environment that accurately replicate real-world complexities while seamlessly integrating the commander's decision-making cycle. Historically, numerous organizations have invested resources to build M&S tools addressing only their own requirements. The result is a vibrant but fragmented landscape of niche M&S tools that can't interoperate. Because only a few of these tools were developed within a shared design, common data backbone, or unified doctrinal framework, the Army has achieved only isolated success rather than an integrated enterprise capability.

M&S capability gaps are often concealed using *white cards*—written representations of events with predetermined analytical conclusions printed on physical index cards handed directly to simulation participants. While white cards have practical value in maintaining the tempo of a training exercise, they are a temporary expedient. By bypassing the processes of collection, processing, and analysis, they eliminate human cognition, thus failing to provide a realistic simulation of the complete analytic process. However, not every exercise can provide comprehensive collective training for every individual Soldier or team. When used appropriately, white cards can facilitate specific training objectives—for example, white-carding a human intelligence (HUMINT) report revealing enemy objectives to keep the scenario moving. This shortcut masks underlying system weaknesses, distorts expectations of what intelligence can realistically deliver, and bypasses critical training opportunities for HUMINT Soldiers and G-2X leadership. In a time of constrained resources, the Army cannot afford to waste these training opportunities for its intelligence professionals.

A Success Story

One of the largest, most productive developments in Army M&S over the past three years has been the *Intelligence and Electronic Warfare Tactical Proficiency Trainer* (IEWTPT).² Originally conceived as a proficiency trainer for operators

and small teams employing a growing suite of complex collection and analysis systems, IEWTPT has evolved far beyond its initial design. Demand has intensified as the Army seeks realistic, scalable training environments for intelligence and electronic warfare operations at the individual, crew, and collective levels.

Today, IEWTPT provides the most complete representation of the Army intelligence warfighting function delivered by the services from the M&S program of record. Its threat models are detailed and operationally relevant, grounded in current realities while adaptable to future conflict trends. Its replication of the intelligence process reveals what information becomes available to tactical decision-makers, when it appears, and how it influences their ability to act. Critically, it achieves this while preserving the hands-on user interface required to build operator proficiency. Simultaneously, IEWTPT continues to modernize in step with evolving Army intelligence capabilities.

IEWTPT functions as a digital intelligence "world." It generates the electronic signatures and data of a simulated battlefield and injects them directly into the Army's real intelligence and electronic warfare systems. Operators must therefore employ actual working systems and equipment under realistic combat conditions to interpret the simulated environment. By forcing analysts to collect, process, and analyze simulated signals, IEWTPT eliminates the artificial shortcuts created by white cards.

Recognizing IEWTPT's value, the *Next Generation Constructive* (NGC) program is integrating key IEWTPT capabilities to support collective training at higher echelons.³ Rather than replicating internal equipment operations, NGC leverages IEWTPT's intelligence data flows through product line engineering to provide a training environment for commanders and their staff at scale.

This division of labor is intentional. The fidelity and complexity required to train intelligence operators is fundamentally different from the abstraction needed for brigade-and

division-level decision-making. Attempting to collapse both requirements into a single system risks producing a solution that serves neither audience well.

Recognizing the need for transparency and traceability of M&S capabilities between the training and experimentation communities, the Department of the Army G-2 developed a unified approach in 2024 to bring order to the intelligence M&S ecosystem. *The Army Intelligence Modeling and Simulation Strategy* provides the azimuth the enterprise has long lacked: a conceptual structure for aligning requirements, reducing duplication, and cultivating a unified approach.⁴ As an example, while the experimentation community may require highly specific classified data and algorithms, the training domain often relies on generalized, unclassified versions. Transparency ensures that intelligence M&S tools and activities are visible across the enterprise, while traceability guarantees that both domains remain linked to the same authoritative lineage rather than diverging into unrelated efforts.

Critically, this strategy recognizes the vital interdependence between IEWTPT and NGC, highlighting the capability gap that would emerge if either program were diminished.⁵ Sustaining both is essential to maintaining a complete, modern intelligence training ecosystem—from the operator’s console to the commander’s decision cycle.

Four Lines of Effort

To execute this vision, the strategy organizes the Army’s intelligence M&S efforts around four lines of effort:

1. **Governance.** Steering the enterprise, preventing duplication, and ensuring the efficient use of resources.
2. **Intelligence Process Representation.** Accurately replicating core Army intelligence functions so that models capture how intelligence operates, rather than simply listing activities.
3. **Authoritative Data.** Establishing consistent, validated sources of truth to ensure analytical credibility across the enterprise.
4. **Interoperability.** Integrating intelligence models and simulations with Joint, coalition, and partner-nation systems.

From Strategy to Action

With the strategy and implementation plan complete, the Department of the Army G-2 has issued an execution order to translate this strategic direction into concrete action across the intelligence community. However, strategies do not implement themselves, nor are they without risk. Success requires active participation; every organization across the intelligence enterprise has a role to play:

1. **Read the strategy and implementation plan.** These are concise, actionable, and designed specifically for leaders and practitioners.
2. **Internalize the azimuth.** Use the common directions to inform organizational requirements, research and development investments, and system development paths.

3. **Leverage the framework.** Align internal organizational development with the broader, unified enterprise approach.

A Final Word

The historical difficulty in modeling the intelligence enterprise stems from a fundamental truth: intelligence is an act of human interpretation, not merely a sequence of physical events. For decades, this complexity has resulted in a fragmented M&S landscape where artificial “white cards” often replace genuine analytical training. The proven success of IEWTPT in creating a realistic, hands-on training environment will now scale through its strategic integration with NGC. Guided by the unifying principles of transparency and traceability in the Army G-2 *Intelligence Modeling and Simulation Strategy and Implementation Plan*, the Army is poised to transform its disparate set of tools into a single, integrated ecosystem. Ultimately, this unified approach will ensure that future simulations effectively prepare intelligence professionals for the complex blend of art and science that defines modern warfare. 🌟

Endnotes

1. Department of the Army, Army Regulation 5-11, *Management of Army Models and Simulations* (Washington, DC: Headquarters (HQ), May 2025), 29.
2. U.S. Army, “Intelligence Electronic Warfare Tactical Proficiency Trainer (IEWTPT), *Capability Program Executive Simulation, Training, Test & Threat* (CPE ST3), accessed July 27, 2026, <https://www.cpest3.army.mil/Project-Offices/PM-SIM/PdM-FTS/IEWTPT/>.
3. U.S. Army, “Next Generation Constructive (NGC),” *Capability Program Executive Simulation, Training, Test & Threat* (CPE ST3), accessed July 27, 2026, <https://www.cpest3.army.mil/Project-Offices/PM-SIM/PdD-NGC/NGC/>.
4. HQ, Department of the Army, Office of the Deputy Chief of Staff of the Army, G-2, *Intelligence M&S Strategy and Implementation Plan* (HQ, Department of the Army, 2026).
5. HQ, Department of the Army, Office of the Deputy Chief of Staff of the Army, G-2, *Intelligence Models and Simulations Strategy* (unpublished strategy document, 2024).

Mr. Ryan Wilson started his Army Civilian career in October 2009 with the U.S. Army Intelligence Center of Excellence (USAI CoE). Mr. Wilson is currently working for USAI CoE as the Director of the Training Aids, Devices, Simulators, and Simulations (TADSS) with a focus on management and oversight of MI simulations, scenarios, and requirements for MI/EW training enablers. He is a graduate of the TRADOC Senior Leader Development Program (2014-2016) and has completed various training and educational courses from MIT and Harvard in support of Executive Management and Leadership.

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