



The Mitchell Forum

Human Machine Teaming: The Intelligence Cycle Reimagined

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Introduction

In the U.S. military, the ushering in of the digital age introduced both a cultural shift as well as a generational divide, but it also offered a new set of technical possibilities. Now is the time to develop a new intelligence cycle to match the speed of information in the 21st Century.

Technologies are developing viable capabilities much faster than imagined just five years ago. However, the amount of information collected by new sensor technology, as well as shared by networking these sensors more widely, is a barrier to realizing the faster decision-making new capabilities were intended to enable. The United States is not alone in this predicament: our allies and partners, as well as our adversaries, struggle with ways to overcome this barrier, but some have begun to adapt. As the U.S. intelligence community (IC) plays its role in assessing both opportunities and challenges related to this problem of "too much information," it must question some of its most foundational elements.

Specifically, the relevance of today's IC and the current intelligence cycle that served as a gold standard for several decades requires rethinking, if not reinvention. The community must think through what artificial intelligence/machine learning (AI/ML) paired with human machine teaming (HMT) will do to the intelligence cycle. There is an urgent need to identify ways to rapidly adapt now and move forward.

Human Machine Teaming

Human Machine Teaming or HMT is the function of task delegation between humans and machines partnering to use innovative technology-based capabilities to achieve desired outcomes.

As a baseline, the current intelligence cycle is composed of five functions:

1. **Planning/Direction:** Identify the subject to study, provide guidance, develop a course of action, and task out accordingly.
2. **Collection:** Prioritize requirements, identify multidomain assets, and task collection assets to gather data.
3. **Processing/Exploitation:** Ingest raw data from various collection assets and conduct a first phase review to determine relevance or whether to retain data.
4. **Analysis/Production:** Assess data from collection efforts—from all intelligence sources and methods such as the established intelligence collection disciplines (INTs)—to identify patterns, anomalies, outliers, and associated elements that, when linked, begin to reveal a story or picture. This would include the first phase reviewed data. This analysis is used to produce an analytic report that is date/time stamped in a searchable format.
5. **Dissemination:** Send data through the IC or to a specific decision-maker.



Figure 1: The Intelligence Cycle.

This cycle was designed to be continuous with one function seamlessly passing off to another and, if warranted, omit intermediate functions. The cycle was based on several assumptions, which created experts that can finely hone the tasks within each function. While unintentional, the cycle grew to become dependent on the time needed to conduct certain activities to achieve desired outcomes. This led to both siloed and sequential processes, with the transitions within the cycle looking more akin to a baton passing in a relay race. One of the follow-on unintended consequences arising from this siloing was further delays in each phase of the cycle to independently ensure all requirements of that segment are identified and met. Whereas the cycle was intended to allow for bypasses within the phases based on the criticality of the intelligence, more often than not, individual phase production schedules reduce that option, and circumventing functions is frowned upon. This suboptimized the speed needed—that is, the speed to get inside the decision cycle of an adversary.

Today, the cycle is centered on humans, using time-proven tradecraft and tools with set data fields, as well as initial advanced analytics applications, to achieve desired outcomes. However, with the advent of AI/ML, and more recently generative AI (Gen AI), such as Open AI, ChatGPT, and Google's Bard, the traditional cycle can no longer keep pace and address the volume or scale of information in today's data rich environment. Nor can the existing tools advance the cycle to the degree or speed the future requires to deal with peer threats. Adding to this dilemma are two central considerations: greater policy/decision-maker influence and the ethical or legal boundaries for using this technology. Policy/decision-makers are demanding greater insights into, and influence over, what the

IC gathers and disseminates. They expect the IC to fuse information rapidly and seamlessly into intelligence and deliver it quickly to the right place, at the right time, in an actionable format. Currently, there is much debate, on-going congressional testimony, and other deliberations examining the impact and effect of Gen AI and whether corporation or Congress need to establish boundaries for its application.

The vast proliferation of AI, machine learning, and generative AI necessitates a shift towards mission-focused human machine teaming that can operate with flexibility and speed to meet ever-compressing data-driven decision-making timelines.

The following proposed human machine-driven AI/ML/Gen AI Intelligence cycle is composed of four interwoven functions occurring continuously and simultaneously as they evaluate anomalies, relationships, and patterns. It requires a framework shift in task delegation between humans and machines. Consider John Boyd's Observe and Orient functions of the Observe, Orient, Decide and Act loop, known more often as the OODA loop. The aim is to speed one's OODA loop more rapidly than an adversary to have decision advantage. In the loop, machines excel in volume search and identifying patterns and outliers, and their processing speed reaches a previously unimaginable scale. The human, on the other hand, excels at validation, intimating

inferred relationships, and critical decision-making based on policies, international law, or rules of engagement—Boyd's Decide and Act functions of the OODA Loop. With this in mind, four functions are proposed for a technology enhanced process.

Discovery: Conduct a wide search and exploration of data using AI/ML/Gen AI to comb through both short and long-term data from various sources, such as publicly available information (PAI) data (social media, news outlets, cultural norms, demographics, and commercially available data); traditional INT information (classified raw and first phase intelligence); and economic and industry data. It is imperative to begin the broad search with PAI as it can alert, tip, and cue anomalies instantaneously or prompt linkages exposed in classified channels. This is primarily done by the machine portion of the HMT, with the human reviewing when needed. Based on HMT assessed criticality, this cycle can easily speed from initial information gathered directly to data dispersed to decision-maker.

Generation: Sense, identify, attribute, and share data to formulate insights or retain data for future use. AI/ML/Gen AI's strength is to sense vast sources of data at speed and scale. This is accomplished through neural networks and algorithms that formulate and identify patterns, anomalies, and indications to attribute characteristics and sources of origin. Authentication of information and source attribution is a critical function to

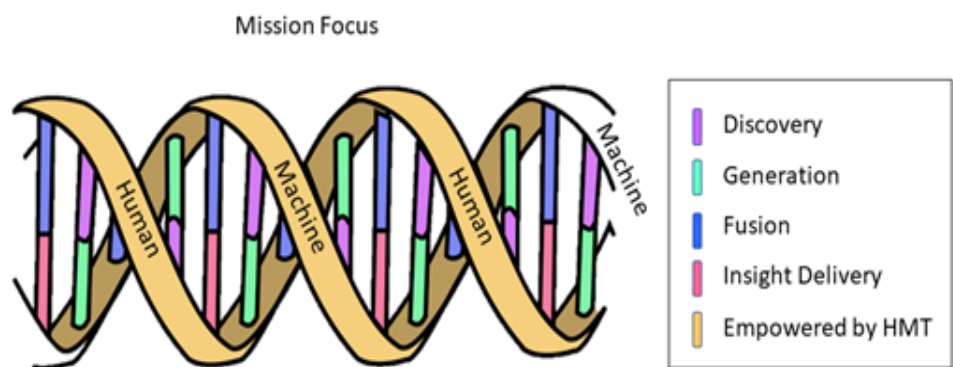


Figure 2: Digital HMT-driven Intelligence Cycle

ensure the identity of data and provide the ability to discredit deep fakes, bots, or malicious fabrications. All of these steps, occurring simultaneously, facilitate the sharing of data by producing outputs discoverable throughout the IC. The machine part of HMT conducts a simultaneous two-pronged function of collection and foundational analysis. By using both raw and finished intelligence from all INTs, PAI, and industry data, it will address the who, what, when, and where. The human element will focus on delineating intent to address the why, provide oversight, and deliver decision-making assessments.

Fusion: Integrate, collaborate, validate, and prioritize information into actionable intelligence analysis providing either or both policy and warfighter decision advantages. The principal amalgamation of information into intelligence is assembled by machine production. The human element is responsible for authentication, verification, prioritization, and decision-making outcomes. As AI/ML/Gen AI becomes more accurate, some functions will require less human interaction; however, the human component of encoding rules will remain essential for validation, accuracy, and prioritization. In other words, the human is responsible for critical thinking and critical reasoning. Again, the output can go in any direction in the cycle, including back to “discovery” for additional searches to fill in gaps or deliver insight to the end user.

Insight Delivery: Distribute intelligence in a wide and encompassing manner. Machine flexibility will rapidly disseminate the intelligence throughout the IC and to decision-makers. Initially, it will be up to the human element to determine access, storage, and retrieval of this intelligence. As the trust between humans and AI/ML/Gen AI grows, the human component will be required to a greater extent to determine quality control of who is using what intelligence for what

purpose. Once the intelligence has been dispersed, the cycle continues with any element required to complete the mission focus or begin newly identified mission priorities.

Accepting and integrating a reimagined intelligence cycle with functions centered on a wider aperture of data via HMT by way of AI-based capabilities offers a valuable proposition that can transform the IC and demonstrate its relevance by providing decision-makers with a timely and precise intelligence advantage. The full array of discovery capabilities provided by AI/ML/Gen AI offers opportunities to fill existing gaps and address seams quickly, deliver insights into decision drivers and processes, and harnesses the power of data from both inside and outside the government, which expands the community’s database immensely but manageably and provides a combination of perspectives to address the challenges faced.

In an era of competition that demands increased data and faster decision-making, it is critical to embrace the velocity that technology can afford, only if we break ourselves out of the existing antiquated intelligence cycle. Once the IC fully experiments with and absorbs the significance of this technology, it will further demonstrate the value of HMT and renew IC relevance. This is how the United States and its allies collectively ensure that machines are used where they shine and in ways that add real value while our most precious resources—people—are likewise used where they can excel and advocate for critical decision-maker outcomes.

This will not be easy, yet it is necessary for today and the future, as the emerging operational environment demands change. Acknowledging the IC’s past successes, to make tomorrow better, is what it has excelled at for decades. The IC must rapidly incorporate these innovative technologies and expand its aperture for future success in order to remain relevant in shaping tomorrow’s decisive battles. 🌟

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About the Author

Lt Gen Dash Jamieson, USAF (Ret.) has 37 years of distinguished military service, having commanded units from the squadron level to a career culminating as the Director of the United States Air Force's Intelligence Surveillance, Reconnaissance and Cyber Effects (A2/6) enterprise. She led both Air Force and Joint units in locations to include Germany, Hawaii, Florida, Afghanistan, and Virginia. She was the driving force behind building a cohesive team of the Air Force's intelligence and cyber forces into a single war fighting organization. Lt Gen Jamieson was the Air Force representative to the 18-member Intelligence Community senior leadership forum representing Air Force equities across the United States Intelligence enterprise.

