Decision Making in the Age of the Machine:
How AI-driven Automation Magnifies the Value of Human Judgment in War (part 1)

When there is more data and analysis behind what is presented to the battlefield commander than he can know, what does that mean for the impact of his decisions? Can he ever even know it? And if he can't, is he really in control?

The modern commander must answer these questions now. With the emergence of AI in his equipment and workflows, the velocity of his own systems continues to become faster than he can keep pace, and those systems continue growing ever more rapidly in scale and scope.

In part 1 of this article I identify this phenomena as automation momentum, where the sheer speed of machine processing can outpace the commander's ability to exercise meaningful control over their own forces, for the advantage of lightning fast speed of computation and battlefield execution. To enable commanders to leverage this velocity, we must adopt a new principle of war, **the principle of cognitive integration,** which is the deliberate balancing of human decision making with the power of AI.

The Problem of Automation Momentum

A conservative estimate places 9,000 drone-based sensors flying per day on the battlefield in Ukraine. The amount of data created by those sensors is tremendous; roughly 6 terabytes a day. You could stream the entire series of Game of Thrones in 4K 12 times over with that amount of data. Modern command and control systems attempt to present that data to the commander in the form of reports and visualizations such as dashboards, powerpoint, or word document reports, and this largely governs the commander's situational awareness in the operation.

Cyberneticists in the 1950s like W. Ross Ashby and Stafford Beer foresaw this situation at the earliest days of the digital age, theorizing that for a regulator (the commander) to maintain control, their own internal "variety," or possible responses, must match the immense variety of the system he seeks to control (the battlefield). Because a human mind cannot process thousands of variables at once, the machine is forced to filter reality down to a manageable size, effectively surrendering the regulator's agency to the algorithm's choice of what to show and what to hide. Cyberneticists of the era focused their efforts on designing tools that amplified a regulator's reach while using smart filters to prevent them from being buried by the noise.

Today, our solution has emerged in layering on more systems, sensors, and methods of presentation in a continual race to bring more awareness and control to the commander. Paradoxically, this creates an explosion of variety because of the exponential increase in potential data states that the addition of more systems brings us. The recent requirement to add AI into our systems accelerates this process by generating non-deterministic layers of complexity. The aggregate of these systems creates a loop that demands ever more sensors and processing layers to be ever more effective.

This is Automation Momentum; a self-reinforcing feedback loop that occurs when process-oriented systems like AI drive organizations to produce, utilize, and act upon ever-growing volumes of data, resulting in the production of more models and insights that require more data to fine-tune. As the requirement for AI is increased, so does the need for more sensors, automation, and integration, creating a momentum that increases the velocity of decisions beyond human ability to keep pace.

The IDF's reported use of AI targeting systems illustrates automation momentum's dangers. According to Israeli intelligence officers, the Lavender system identified up to 37,000 potential targets with human personnel "often serving only as a rubber stamp," sometimes approving targets in 20 seconds by merely confirming gender. As one source stated: "Because of the system, the targets never end. You have another 36,000 waiting." The head of an Israeli intelligence unit describing human personnel as a "bottleneck" and lamenting: "We cannot process so much information." This is a larger issue than ensuring a human is in a loop on a kill chain. When the question is ‘could a human meaningfully assess what they were approving?’ it is an issue of decision makers having authority, but not comprehension.

The situation is increasing in scope as militaries increase the speed of their race to integrate AI into their workflows. The confluence of rapid increases in data, speed, and integration manifest the phenomena of automation momentum.

The Cognitive Dynamics of AI in Warfare

Modern command and control systems act as filters by design, that discard the vast majority of environmental variety (data) to fit the human requirement for a dashboard, situation map, or some other method of presentation. This reliance on a filtered digital reality over physical ground truth is the primary driver of automation momentum. Within this automation momentum, commanders and analysts become increasingly boxed-in to algorithmically generated understandings of reality, mistaking the speed and precision of automated systems for depth and insight.

Let's return to the Ukraine example. If 9000 drones generating 6 terabytes of data is funneled down to a presentation of 100 4MB targets to the commander, the commander is only seeing 0.006% of the reality the drones see. Quantitatively, if the machine is discarding 99.9% of the variety of the battlefield, the commander is essentially looking at the battle through a pinhole.

A paper on Ukraine last March by CSIS noted the number 1 challenge for ISR was that drones were generating large volumes of data that “exceed human processing capabilities.” Real world studies confirm this phenomena of narrowing perception, such as NASA's findings that over 70 percent of information transfer deficiencies occur during high-workload conditions, degrading situational understanding. In this environment, the commander’s capacity to make decisions has essentially been eroded by a sea of data necessary for our AIs to take action at scale.

This perceptual funnel creates a situation where the commander remains "in the loop" by pressing buttons or giving orders, yet is cybernetically decoupled from reality. Automation momentum creates a form of perceptual inertia where human judgment becomes subordinated

to the logic of automation itself. At the decisive point, this inertia can cause the commander to mistake the most calculated option for the correct one.

Even the U.S. Air Force's experimental DASH program, designed to enhance human-machine teaming, reveals the tensions. While AI generated recommendations 90% faster than humans with 97% validity compared to humans' 48%, commanders remain uncertain. As one general admitted: "Even though there may be significant automation, there will have to be, at some point, a human to decide this is the right thing to do." But, which decisions? And how can humans maintain meaningful judgment at machine speed?

The transformative impact automation momentum has on human judgement is that on the cybernetic battlefield, as the power of any one decision made within it is exponentially increased, the decision maker's connection to the reality those decisions occur in is tremendously decreased. This has the greatest impact on uniformed decision makers at the highest echelons, and the policy makers above them for the same reasons.

Automation momentum is the imperceptible terrain of the modern battlefield, and affects the nature of warfare itself, at the strategic, operational, and tactical levels. It is a fundamental rule that should guide how organizations should approach and think about the conduct of operations.

Decision Making in the Age of the Machine:
How AI-driven Automation Magnifies the Value of Human Judgment in War (Part 2)

In part 1 of this article I described automation moment, the increasing velocity and volume of data processed by AI, which threatens to subordinate human judgment to machine logic on the modern battlefield. In this article I offer a solution in the principle of cognitive integration.

The Principle of Cognitive Integration

Automation momentum is the imperceptible terrain of the modern battlefield, and affects the nature of warfare itself, at the strategic, operational, and tactical levels. It is a fundamental rule that should guide how organizations should approach and think about the conduct of operations.

Thus, a new principle of warfare is required for conflict in the age of AI; the Principle of Cognitive Integration. The Principle of Cognitive Integration is the effective blending of human will and judgement with the speed, data processing power, and predictive capabilities of artificial intelligence.

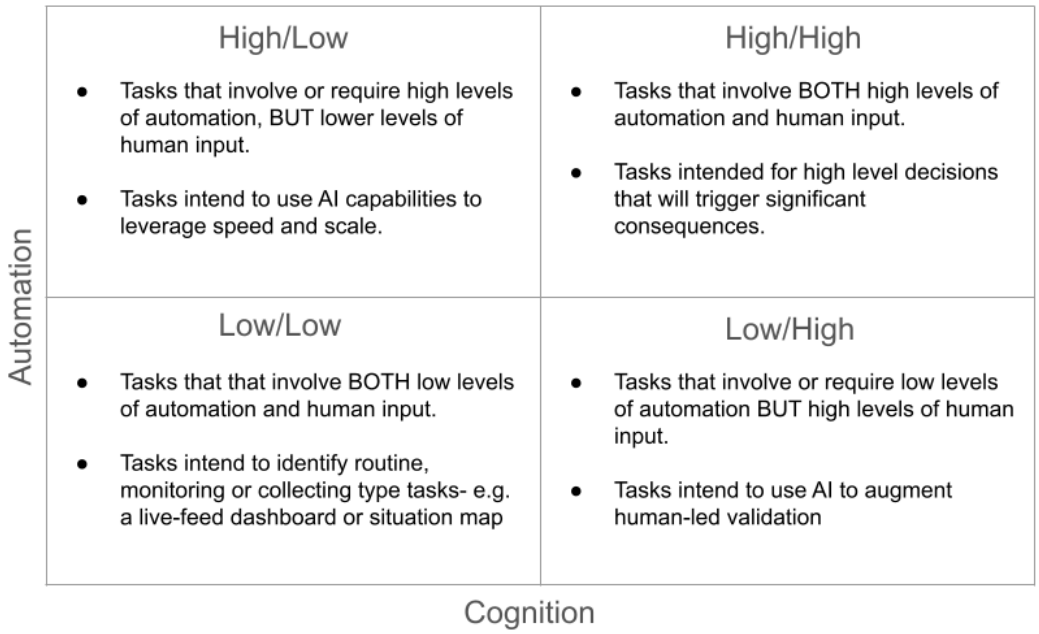
Commanders must deliberately designate which decisions require human judgment unconstrained by machine speed, and which leverage automation for velocity, never allowing automated recommendations to compress reflection time below the threshold needed to assess consequences beyond the model's dataset.

Cognitive integration requires commanders to map where automation resides at each echelon and how it shapes subordinate decision space. At the strategic level, this means understanding how a single AI-informed parameter adjustment cascades through planning systems, potentially binding lower commanders to choices invisible in their orders. At tactical and operational levels, cognitive integration demands linking automated systems to unfiltered ground truth, preventing headquarters from commanding through algorithmic abstractions rather than battlefield reality.

Commanders must identify where adversaries rely on automation versus judgment and attack the seams. Disrupt enemy algorithms where they constrain decisions; force situations outside of the scope of their models. By denying adversaries cognitive integration while maintaining their own, commanders collapse enemy decision-making processes.

This deliberate cyberization of command empowers commanders to maintain strategic control and ensures they understand where decisions to trigger leverage lie in their processes. Commanders should address this principle relative to their specific organizations and functions.

The Cognitive Integration Matrix (CIM) in figure 1 illustrates one possible way in which to frame this visually. The AI-driven model calculates probability while the human manages consequence.



Tradeoffs of Cognitive Integration

Cognitive integration presents advantageous capabilities in the form of leverage to key decision makers, but at the cost of risks to mission command, operational continuity, and perception of risk.

Leverage

Automation momentum magnifies the impact of a single human judgment to a degree previously unimaginable through its characteristic of leverage. Leverage is the single most advantageous capability that automation momentum provides the commander. Leverage displaces friction for the commander by providing him the capability to take action without the need for subordinates to the level required in the past, with instantaneous speed.

Where the traditional operations process distributes critical choices and actions across a chain of command hierarchy, diluting the impact of any one leader, the AI-driven automated environment concentrates it. A decision that once required a sequence of orders from a higher headquarters, down to commanders, down to their staffs, and finally down to the platoon leader facing the real-world situation can now be triggered by an individual command, unleashing a high-velocity chain of automated consequences. When that **cost of action** drops to zero, the **value of decision** skyrockets.

There are 2 forms of leverage we can consider, kinetic and cognitive.

A simple example of kinetic leverage is the capability of a commander to simply press a button to activate a drone fleet. In the summer of 2020, AI in Project Maven did just that when it

gathered intel, identified and selected a target, and upon human approval ordered an M142 HIMARS to strike it in live fire. 4 years later it continued doing the same in actual conflict in Yemen, Iraq, and Syria.

Cognitive leverage on the other hand is the automation of the tools of representation that we use to communicate and direct our organizations now. Our text outputs, visualizations, and code have mastered this; things like our dashboards and slides. AI's presence in our workflows is now ubiquitous; one would be challenged to find a staffer who does not have Chatgpt or Claude open in a browser tab as they write emails, construct plans, or search for information.

In the recent Air Force Experiment 3 exercise, operators used AI tools to accelerate targeting decisions and reduce cognitive load, with the system providing real-time recommendations that reshaped how quickly a single team could move through the kill chain. These recommendations highlights a form of cognitive leverage present today: a human adjusting a single parameter, such as an estimated adversary range, a target priority, or a logistics constraint, can cascade instantly through models, dashboards, and planning tools, shaping the perceptions and therefore the decisions of leaders across an entire headquarters and the subordinate echelons below it.

The risks for commander wielding leverage then, are the 3 areas automation momentum impacts most adversely; mission command, exploitation, and risk.

The Erosion of Mission Command

Automation momentum threatens mission command, the leadership philosophy of decentralized execution based on commander's intent, by concentrating decision making power back at the headquarters.

The weight of a single commander's decision with automation momentum has such strength and can carry such ramifications through its characteristic of leverage that it may inadvertently have shaping impacts on commanders down-echelon, disrupting available decisions of subordinate leaders closest to the real-world fight. Decisions that were once obviously appropriate to be made for a given operation may now be hidden in the automated-triggers of our tools. The greater the automation applied to an operation, the greater the degree to which mission command is eroded.

Exploitation Amplification

Automation momentum's re-weighting of exploitation impacts planning. The seemingly infinite insight provided by AI tools can blind us from the fact that the insight is limited within the model that the tools have produced. This creates blind spots that, when exploited, can have catastrophic impacts on the operation.

Military planning is a formal process, codified in doctrine, taught in military education, and formally evaluated in training. Standard planning processes such as the Military Decision

Making Process or the Joint Planning Process, already designed to optimize within known parameters now augmented with AI-tools, become vulnerable to these blind spots.

The telescoping capability of AI-powered insight that this presents the staffer is enormous; one can summon almost infinite detail instantaneously for anything within the model's dataset, but at the expense of consideration for anything outside of it. The Hubble Space Telescope can show us galaxies millions of light years away with perfect clarity, but it cannot show what lies just beyond the frame.

Risk Distortion

Perception of risk incurs the largest impact of automation momentum. Risk distortion means the limits of the model's dataset shapes the decision maker's sense of operational risk.

As a result the commander's attention is drawn to the insights a powerful yet limited model AI tools have provided. This can cause the commander to lose sight of important decisions, and invest his time and resources into lesser decisions. The model can calculate the probability of success, but only a human can weigh the consequence of failure.

Risk distortion directly impacts the what, when, and where of force deployment, as well as the mission statement given to the battlefield commander. The "winnability" of wars for the battlefield commander will depend on the strategist's understanding of this aspect of automation momentum.

The Way Forward

Implementation of this principle of warfare should be treated as both a tremendous and fleeting opportunity given the explosive growth of modern tech. Immediate changes involve relooking how we operationalize red teaming and design methodology in staffs at the strategic, operational, and tactical echelons as a means of breaking out of the paradigm presented to us by our systems, while maintaining creativity to conduct operations in novel ways. DOTMLPF-P structural changes must accommodate staff changes to balance AI-driven systems as they continue to be introduced in the force.

Because of the scope of organizations automation momentum touches, formal dialogue between senior uniformed leaders, industry partners, and policy makers is needed now. Given the speed at which automation is transforming warfare, we cannot afford to wait to decide how to balance machine speed with human judgement; the sooner we can address it, the greater our ability will be to shape it. Future victory will belong not to the commander with the most intelligent AI, but to the commander that can still think freely alongside it.

DECISION MAKING IN THE AGE OF THE MACHINE

LTC(ret) Chris Ghorbani | RAINCLOUD

THE DATA DELUGE

9,000

SENSORS PER DAY

Deployed across Ukraine.

6 TERABYTES

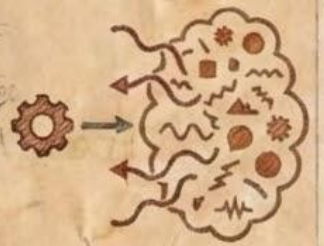
DATA CREATED DAILY

"The automation of war means human judgment becomes rarer—and more decisive."

THE LAW OF REQUISITE VARIETY

"Only variety can absorb (or destroy) variety."

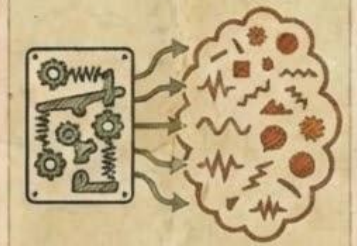
IMBALANCE (INEFFECTIVE)



REGULATOR (Limited Variety) — SYSTEM/DISTURBANCES (High Variety)

FAILED REGULATION
Regulator's responses are insufficient to handle system states.

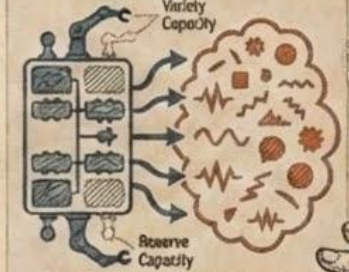
BALANCE (EFFECTIVE)



REGULATOR (Matching Variety) — SYSTEM/DISTURBANCES (High Variety)

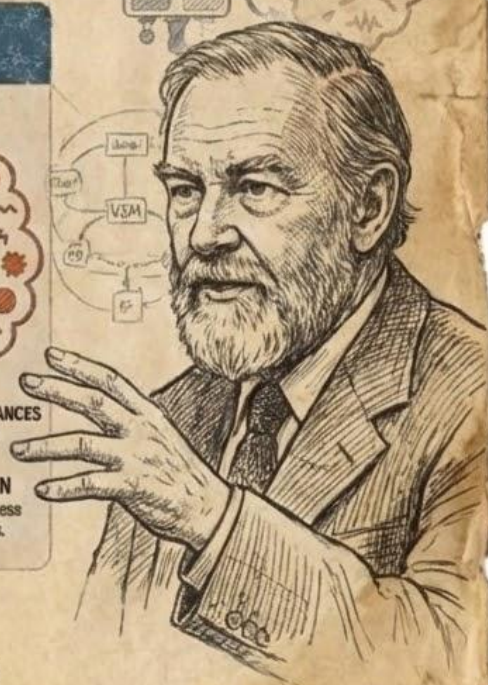
STABILITY ACHIEVED
Regulator possesses at least as much variety as the system.

SURPLUS (RESILIENT)



REGULATOR (Surplus Variety) — SYSTEM/DISTURBANCES (High Variety)

RESILIENCE & ADAPTATION
Surplus variety provides robustness against unforeseen disturbances.



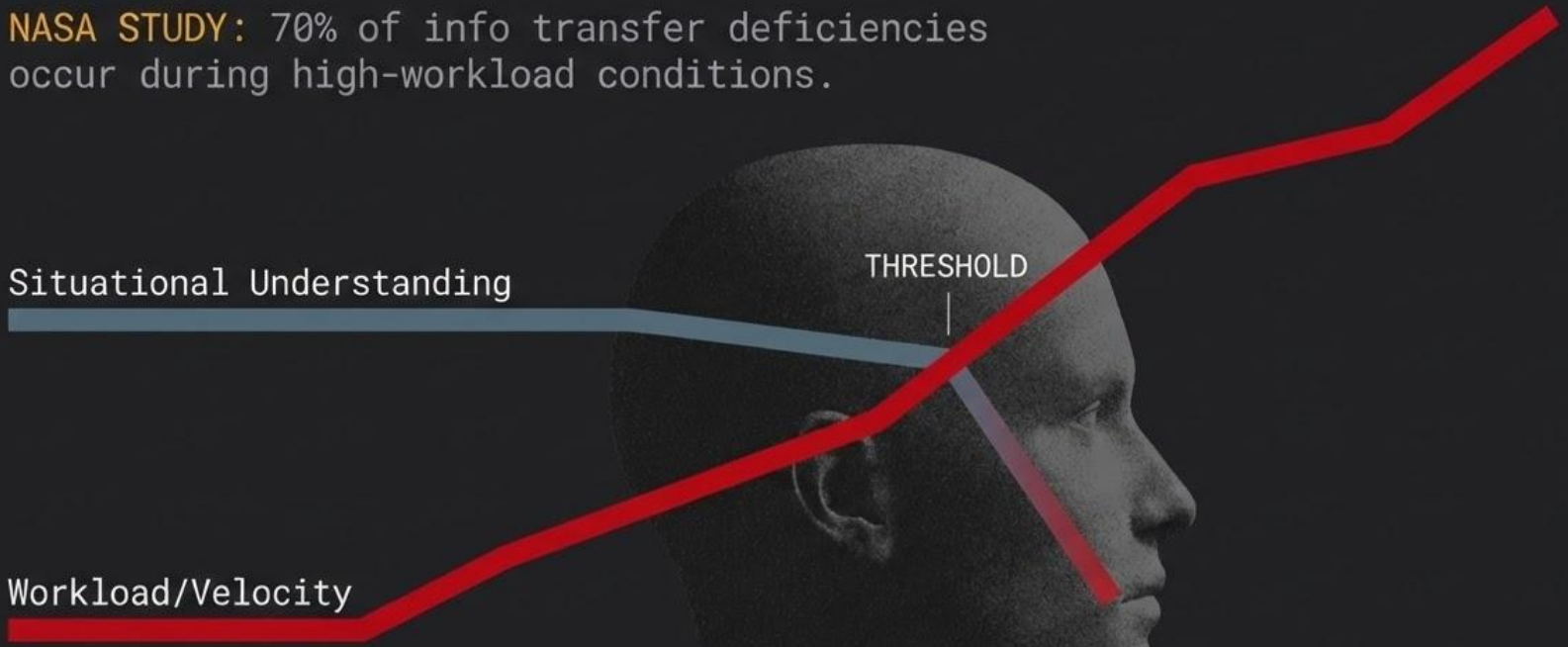
In order to achieve effective regulation and stability, a regulator or control mechanism **must possess at least as much variety (range of possible states or responses) as the disturbances** or the system it seeks to control.

THE PROBLEM OF AUTOMATION MOMENTUM

A self-reinforcing feedback loop where AI systems drive the production of data, requiring more models, which require more data to fine-tune.

THE CAPACITY CEILING

NASA STUDY: 70% of info transfer deficiencies occur during high-workload conditions.



As AI increases the velocity of war, it degrades the commander's situational understanding. We are imperceptibly eroding the capacity to decide.

THE ADVANTAGE: LEVERAGE

Leverage displaces friction...
providing the capability to take action
without the need for subordinates...
*with **instantaneous speed.***

Insight: A single human judgment can now cascade instantly through the entire battlespace.

THE CONCEPT OF LEVERAGE

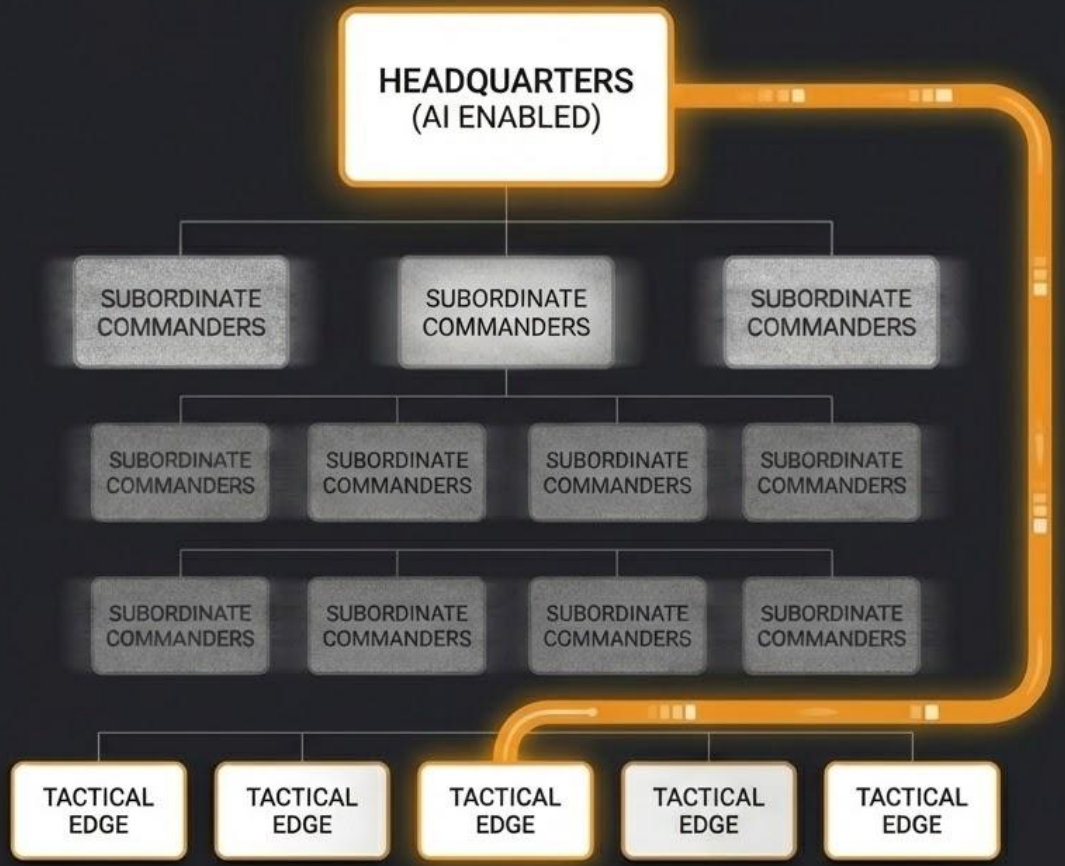
KINETIC LEVERAGE

COGNITIVE LEVERAGE

"Leverage displaces friction for the commander by providing him the capability to take action… with instantaneous speed."

THE EROSION OF MISSION COMMAND

- Leverage concentrates decision-making power back to the Headquarters.
- Leverage bypasses subordinate decision-cycles.
- De-synchronization: Tactics at the edge shaped by algorithm-supported decisions at the core.

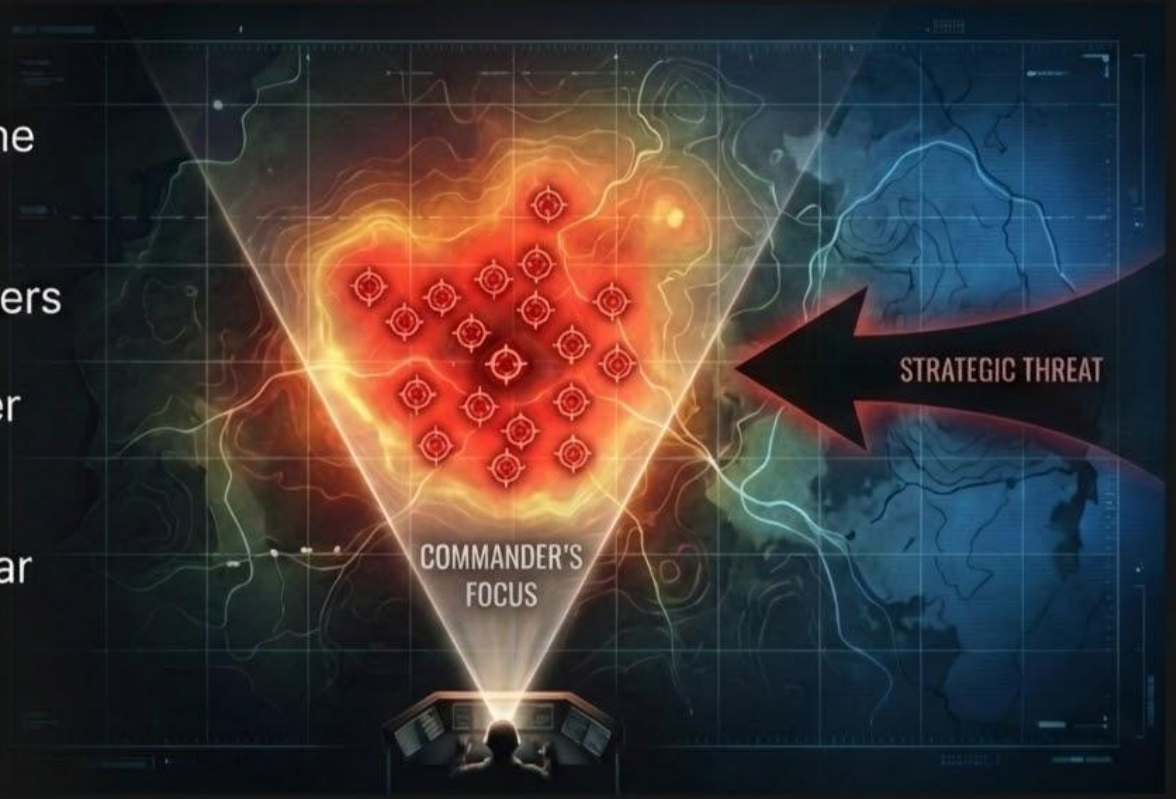


EXPLOITATION AMPLIFICATION

- **The Telescope Trap:** Infinite clarity inside the dataset; total blindness outside of it.
- **Optimizing for Vulnerability:** AI-optimized planning creates predictable blind spots.
- **Catastrophic Risk:** The adversary exploits exactly what the model effectively ignores.

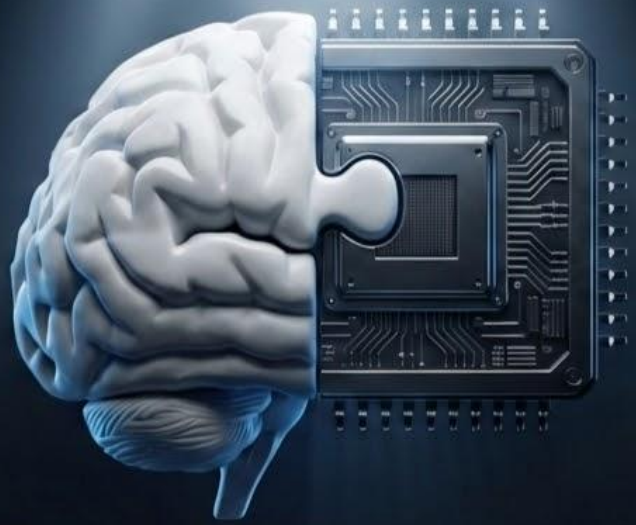
RISK DISTORTION

- **Perception**: The dataset and model limits shape the perception of risk.
- **Misallocation**: Commanders invest resources in “calculated” options rather than “correct” ones.
- **The Trap:** We fight the war the model presents, not the war that exists.



IMPLEMENTATION PARTNERS:

1. Policy Nakers
2. Senior Uniformed Leaders
3. Industry Partners



THE PRINCIPLE OF COGNITIVE INTEGRATION

The effective blending of human will and judgment with the speed, processing power, and predictive capabilities of AI.

Cyberization must be deliberate – Choosing exactly where to integrate automation and where to retain human cognition.

SHAPING FUTURE COGNITION, NOW

Senior Uniformed Leaders - Policy Makers - Industry Partners

Deliberate integration of cognition in the nascent stage of AI development grants exponential benefits in the future.

CONCLUSION

Future victory will belong not to the commander with the most intelligent AI, but to the commander that can still think freely alongside it.