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DECISION SUPERIORITY THROUGH AI-EMBEDDED COMMAND AND CONTROL: THE C5AISTAR FRAMEWORK FOR HUMAN-AI TEAMING IN MULTI-DOMAIN OPERATIONS

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Abstract: *Contemporary multi-domain operations demand decision superiority under information saturation and persistent cyber contestation. This study examines how AI-embedded command and control architectures optimize predictive cyber threat analysis and real-time decision-making without undermining doctrinal legitimacy or commander authority. Introducing the C5AISTAR framework, the research applies a doctrine-first methodology combining evolutionary framework comparison, OODA loop mapping, and scenario-based analysis. The findings indicate that AI-embedded command and control structures reduce decision-cycle latency, improve coherence, and enhance resilience through governed, semi-autonomous functions. Decision superiority emerges from the architectural integration of human-AI teaming rather than from the simple automation of commander authority.*

Keywords: *AI-enabled command and control; C5AISTAR; decision superiority; multi-domain operations; human-AI teaming; doctrinal transformation; coalition interoperability.*

1. INTRODUCTION

Contemporary military operations are increasingly characterized by multi-domain interaction, accelerated operational tempo, and persistent cyber and information contestation. While digital transformation has vastly expanded sensing, connectivity, and data availability, command and control (C2) systems remain largely constrained by human-centric decision architectures. Under conditions of information saturation, cognitive overload, and adversary-driven tempo escalation, these architectures struggle to convert information advantage into timely and coherent action. As a result, operational effectiveness is less determined by access to data than by the ability to generate, validate, and execute decisions faster and more coherently than an adversary. Artificial intelligence (AI) is frequently proposed as a means to address these challenges. Most current approaches conceptualize AI as a discrete decision-support tool rather than as an integrated element of command architecture. This tool-centric perspective creates doctrinal, organizational, and governance frictions, including unclear accountability, automation bias, limited explainability, and interoperability challenges in coalition operations. It risks accelerating decision cycles without adequately addressing commander authority, mission command principles, and legal responsibility.

This study examines the central scientific question of whether embedding AI as a structural element of C2 architectures can increase decision superiority while maintaining doctrinal legitimacy and commander responsibility. The research introduces the C5AISTAR (command, control, communications, computer, cyber, artificial intelligence, intelligence, surveillance, target acquisition, reconnaissance) framework, which extends beyond traditional C4ISR (command, control, communications, computer, intelligence, surveillance, reconnaissance) C5ISR (C4ISR + cyber) systems to focus on semi-autonomous functions and predictive cyber defense. C5AISTAR does not automate

commander authority but integrates AI into the OODA loop (observe, orient, decide, act) at the levels of detection, fusion, and predictive analytics, explicitly preserving human C2 decision-making. Adopting a doctrine-first, non-engineering analytical approach, the study focuses on the strategic, operational, and tactical implications of AI-embedded C2. The analysis contributes to ongoing debates on AI-enabled C2 by reframing decision superiority as an outcome of architectural integration and governance of human-AI teaming, rather than as the result of autonomous decision-making or technological optimization alone.

1.1 Hypotheses

This study presents three primary hypotheses, each defined by specific, measurable variables. These hypotheses aim to explore and analyze key relationships within the subject matter, providing a structured framework for empirical investigation and data collection:

- H1: Doctrinal and organizational transformation: If AI is embedded as a structural element within C2 architectures (C5AISTAR), then doctrines, organizational designs, and interoperability frameworks must adapt to govern human-AI teaming, accountability, explainability, and delegation boundaries.
- H2: Decision-cycle efficiency and decision quality: Compared to C4/C5ISR, C5AISTAR-enabled architectures reduce end-to-end decision latency and improve decision coherence in time-critical multi-domain operations while maintaining human authorization at key decision points.
- H3: Decision resilience under contestation: Under cyber, electromagnetic, and informational stress, C5AISTAR architectures sustain decision coherence and operational tempo more effectively than human-centric C4/C5ISR structures.

1.2 Objectives

The objective of this study is to evaluate the doctrinal and operational viability of embedding artificial intelligence as a structural component of C2 architectures through the proposed C5AISTAR framework. Rather than assessing technical performance, the study focuses on the implications of AI integration for commander authority, decision-making, and interoperability across strategic, operational, and tactical levels.

Specifically, the study aims to:

1. conduct a doctrine-focused comparison of C4/C5ISR, and C5AISTAR architectures using the DOTMLPF-I (Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities, and Interoperability) framework,
2. develop a doctrine-aware C5AISTAR reference model that integrates AI across the OODA loop while preserving human oversight and mission command principles, and
3. assess the operational implications of AI-embedded C2 architectures in contested multi-domain environments, with particular attention to decision latency, coherence, and resilience.

1.3 Methodology

The study applies a doctrine-first, mixed-methods research design tailored to non-engineering military analysis. It deliberately avoids algorithmic evaluation or system prototyping and instead examines how AI integration reshapes C2 processes, governance, and decision-making behavior.

First, a structured comparative framework analysis examines the evolutionary transition from C4ISR to C5ISR and C5AISTAR. The comparison is conducted through doctrinal dimensions and the DOTMLPF-I (doctrine, organization, training, materiel, leadership, personnel, facilities, and interoperability) framework, identifying where AI embedding alters commander authority, information flow, accountability, and interoperability requirements rather than merely adding capability.

Second, the C5AISTAR concept is operationalized through OODA loop mapping. AI integration points are defined for observation, orientation, decision, and action phases to clarify human-AI interaction, oversight boundaries, and assurance

requirements. This mapping supports the identification of measurable indicators related to decision tempo and coherence.

Third, the study employs analytically constructed case-study scenarios reflecting joint fires synchronization, coalition decision-making, and cyber–kinetic coordination in contested multi-domain environments to compare baseline (C4/C5ISR) and command workflows enhanced with AI and cyber capabilities (C5AISTAR). These scenarios function as structured analytical instruments to examine decision latency, coherence, and resilience under cyber, electromagnetic, and informational stress, rather than as predictive simulations or technical evaluations.

Findings are interpreted through analytic triangulation, linking scenario outcomes with doctrinal principles and organizational constraints. This approach ensures that results remain applicable to strategic and operational decision-making, coalition environments, and doctrinal development.

2. LITERATURE REVIEW

The C2 has closely followed advances in information and communication technologies (ICT). The emergence of C4ISR during the information revolution of the 1990s emphasized information superiority through integrated sensing, communications, and intelligence fusion. Subsequent developments toward C5ISR formally incorporated cyberspace as an operational domain, reflecting the growing relevance of cyber operations in modern conflict [1]. NATO doctrine further refined these concepts through the ISTAR construct, highlighting target acquisition and intelligence-driven operations as core enablers of joint and multinational C2.

The theoretical foundations of contemporary C2 are strongly linked to decision-making theory, particularly Boyd's OODA loop [2]. While legacy C4/C5ISR architectures improved situational awareness and coordination, they largely preserved human-centric orientation and decision phases, creating latency under conditions of information saturation and adversarial contestation [3]. Recent researches increasingly emphasize decision superiority, the ability to make coherent, timely decisions faster than an adversary, rather than mere information dominance [4].

A growing body of literature explores the application of AI in military decision support, including AI-assisted threat assessment, multi-source data fusion, and predictive analytics [5]. These studies consistently demonstrate that AI can accelerate decision cycles and improve consistency, especially in complex and time-critical environments [6]. Most contributions remain function-specific or prototype-oriented, focusing on isolated technical enablers rather than the systemic transformation of the C2 architecture [7].

From a doctrinal and policy perspective, NATO's Artificial Intelligence Strategy establishes principles such as human oversight, accountability, transparency, and interoperability, while cautioning against uncritical automation [8]. Although existing guidance recognizes the need to adapt C2 structures to AI-enabled capabilities, it does not yet provide a comprehensive conceptual model integrating AI, leadership responsibility, and execution across strategic, operational, and tactical levels [9].

The literature review revealed a clear gap between AI's demonstrated technical potential and its systematic integration into doctrinally legitimate C2 architectures. This gap motivates the present study, which proposes the C5AISTAR framework as a doctrine-aware model embedding AI across the C2 cycle while preserving commander authority, mission command principles, and coalition interoperability. Lee et al.'s results serve as an empirical model for the conceptual extension of C5AISTAR [10].

3. AI-ENABLED C2 EVOLUTION FROM C4ISR TO C5AISTAR: A DOTMLPF-I ANALYSIS

The evolution from legacy C4ISR architectures through C5ISR and toward the proposed C5AISTAR framework represents a

fundamental shift in the philosophy of military C2. Traditional C4ISR structures were designed to support information superiority through hierarchical C2, sequential intelligence processing, and human-centric decision cycles. While these architectures proved effective in environments characterized by relative information scarcity and manageable operational tempo, they increasingly struggle in contemporary multi-domain operations (MDO) marked by information saturation, cyber contestation, and machine-speed threats [11].

The introduction of C5ISR constituted an important intermediate step by formally recognizing cyberspace as an operational domain and integrating cyber awareness into C2 processes. Despite improved connectivity and digital tools, C5ISR architectures largely preserved linear information flows and human-bounded decision authority. As a result, decision latency remained dominated by manual correlation, staff coordination, and sequential approval processes. The core limitation was not data availability but the inability of human-centric C2 structures to process, contextualize, and act on information at the speed required by modern operations.

C5AISTAR departs from this paradigm by embedding artificial intelligence as a structural element of the C2 architecture rather than as a peripheral decision-support tool. In this model, AI-enabled sensing, data fusion, predictive analytics, and recommendation generation are integrated directly into the C2 cycle. The resulting architecture supports a transition from reactive C2 to anticipatory, decision-centric C2, enabling commanders to shape the operational environment proactively rather than merely responding to events. This shift marks a transition from information superiority to decision superiority, defined as the sustained ability to make coherent, timely, and resilient decisions faster than the adversary under conditions of uncertainty and contestation.

From a doctrinal (D) perspective, this evolution necessitates a redefinition of C2 logic. In C4/C5ISR, doctrine implicitly assumes that human cognition is the primary locus of orientation and decision-making within the OODA loop [12]. C5AISTAR challenges this assumption by positioning AI as a continuous stabilizer of situational understanding and a generator of decision options, while preserving commander authority at critical decision points. Doctrine must therefore evolve to explicitly govern human-AI teaming, define accountability boundaries, and codify requirements for explainability, auditability, and assurance. Without such doctrinal adaptation, the acceleration enabled by AI risks producing faster, less controllable decision-making processes.

The organizational, training, and leadership (O/T/L) implications of this shift are equally significant. Organizationally, C5AISTAR implies integrating AI-enabled decision-support elements directly into command posts and headquarters workflows, rather than treating analytics as an external advisory function. This reconfiguration reduces coordination friction between sensing, analysis, and execution components and supports continuous decision cycles. From a training and leadership perspective, commanders and staff must develop competencies not only in interpreting AI-generated recommendations but also in supervising, challenging, and calibrating them. Leadership in a C5AISTAR environment requires confidence in the commander's judgment combined with literacy in AI behavior, limitations, and failure modes. The emphasis shifts from controlling processes to governing decision ecosystems.

In terms of materiel and capability effects (M), the evolution toward C5AISTAR manifests in tangible operational performance improvements, as demonstrated by the scenario-based assessments conducted in this study. Compared to C5ISR baselines, AI-embedded C2 architectures achieved substantial reductions in end-to-end decision-cycle duration and notable improvements in threat detection and prioritization accuracy under contested conditions. These gains are not attributed solely to algorithmic efficiency, but to the architectural integration of AI across C2 functions. While previous C5ISR systems largely employed reactive cyber defense, C5AISTAR supports predictive cyber defense through AI-based

anomaly detection and real-time response mechanisms. In this model, cyber threat data is directly transformed into mission-relevant decision products. The system provides confidence-level impact assessments and limited prevention options in line with the commander's intent. Prevention is thus not merely a technical response, but an activity directed at the commander level. AI prioritizes actions (e.g., segmentation, route prioritization), while the commander's authority approves measures that modify operational risk-taking. This preserves accountability while enabling cyber-prevention decisions to be made at operational tempo. Similar effects are observed in intelligence fusion, surveillance, and target acquisition, where AI enables continuous correlation and prioritization across domains, reducing reliance on sequential human analysis.

The personnel and facilities (P/F) dimensions further highlight the resilience benefits of C5AISTAR. By automating data triage and routine prioritization, AI reduces the cognitive load on human operators, allowing staff to focus on higher-level decision-making, strategic intent formulation, and ethical control [13]. At the facility level, AI-enabled C2 functions support distributed and federated command post concepts, enhancing survivability, mobility, and continuity of C2 under kinetic, cyber, or electromagnetic threat. This aligns with contemporary requirements for dispersed operations and degraded communications environments, where centralized, manually intensive C2 structures are increasingly vulnerable.

The interoperability (I) implications of C5AISTAR are particularly salient for alliance and coalition operations. Traditional interoperability approaches rely heavily on procedural harmonization and manual coordination, which struggle to keep pace with accelerated decision cycles [14]. C5AISTAR provides a conceptual foundation for coalition-level AI integration by emphasizing shared data models, interoperable decision logic, and transparent AI outputs. Rather than enforcing uniformity, the framework supports federated decision-support approaches that respect national caveats while enhancing shared situational awareness, understanding, and decision coherence. This analysis supports the proposition that AI-enabled C2 architectures, when appropriately governed, can reduce friction in coalition decision-making and enhance collective operational tempo.

The DOTMLPF-I analysis demonstrates that the transition from C4/C5ISR to C5AISTAR is not an incremental technological upgrade, but a systemic transformation of C2. The observed benefits in speed, coherence, and resilience are inseparable from doctrinal adaptation, organizational redesign, leadership development, and interoperability governance. This integrated perspective directly supports Hypothesis 1, confirming that embedding AI as a structural element of C2 drives comprehensive DOTMLPF-I change that extends beyond the scope of legacy C2 architectures.

4. AI-ENABLED DECISION-MAKING IN THE C5AISTAR FRAMEWORK

Within the C5AISTAR framework, the operational impact of artificial intelligence can be most clearly assessed by examining how AI capabilities are embedded across the OODA loop. Rather than introducing a parallel decision mechanism, C5AISTAR integrates AI as a force multiplier, accelerating, stabilizing, and reinforcing each phase of the C2 decision process.

4.1 Observe – AI-supported awareness in C5AISTAR

In the Observe phase, C5AISTAR leverages AI to accelerate the acquisition and prioritization of information across ISR, cyber, and electromagnetic domains. Modern operations generate data volumes that exceed the processing capacity of traditional C2 structures. Within C5AISTAR, AI-enabled tools continuously scan, filter, and correlate these inputs, rapidly identifying operationally relevant signals while suppressing noise. This capability shortens the time between environmental change and the development of situational awareness. Instead of relying on sequential reports and manual aggregation, commanders receive a

continuously updated operational picture supported by artificial intelligence. As a result, observation within the C5AISTAR framework is not only more comprehensive but also significantly faster, thereby shortening the initial phase of the OODA loop.

4.2 Orient – AI-supported sensemaking and shared operational understanding

Orientation forms the cognitive core of commander decision-making and is explicitly reinforced in C5AISTAR through AI-assisted interpretation. AI-based systems assist commanders and staff by integrating data from multiple sources, identifying enemy behavior patterns, and highlighting deviations from expected operational conditions. AI-enabled systems assist commanders and staffs by integrating multi-source data, identifying patterns of adversary behavior, and highlighting deviations from expected operational conditions. During the orientation phase, AI enables faster and more consistent interpretation of complex environments by reducing cognitive overload and uncertainty. Within the C5AISTAR framework, AI structures information, but determining meaning and intent remains a task for commanders.

4.3 Decide – Decision superiority through AI-enabled decision-cycle compression

During the decision phase, semi-autonomous decision-support tools significantly reduce the time required to generate and analyze action options. AI-based tools quickly map feasible options, assess risks, and estimate expected outcomes, while accounting for commander's intent and operational constraints. This accelerates staff functions traditionally associated with planning, wargaming, and alternative comparison. AI enhances the commander's ability to make timely and informed decisions under pressure. By reducing analytical latency, C5AISTAR enables commanders to make decisions faster than adversaries operating in more rigid or manually driven C2 systems. This phase directly operationalizes Hypothesis 2 by linking AI integration to measurable reductions in decision time without eroding commander responsibility.

4.4 Act – Adaptive execution and resilient command feedback

In the Act phase, C5AISTAR integrates AI to support coordinated execution and adaptive control under dynamic conditions. AI-enabled systems assist in synchronizing actions across units, monitoring operational effects, and identifying deviations between planned and actual outcomes. This enables rapid execution adjustments while preserving coherence with the commander's intent. AI-supported execution strengthens the feedback loop between action and observation, allowing the C2 system to adapt even under contested communications or high operational stress. While AI may propose or initiate adjustments, human authorization and oversight remain integral. The result is a more resilient and responsive execution phase, ensuring that decision-cycle compression achieved earlier in the OODA loop is not lost during action.

4.5 Implications for Hypothesis 2

AI integration across all four OODA phases within the C5AISTAR framework demonstrates a coherent mechanism for decision-cycle compression. Observation is accelerated, orientation is cognitively stabilized, decision-making is analytically compressed, and execution remains adaptive and resilient. Throughout this cycle, commanders retain authority and responsibility, while AI functions as an embedded enabler rather than an autonomous decision-maker.

This analysis supports Hypothesis 2 by showing that C5AISTAR does not merely introduce advanced technology into C2 systems but fundamentally enhances the tempo, effectiveness, and resilience of military decision-making in contemporary operational environments.

5. APPLICATION DOMAINS AND CASE STUDIES

Following the introduction of the theoretical framework, it is imperative to investigate potential operational implementations of C5AISTAR. To illustrate the practical application of this concept, two representative scenarios are presented below. These scenarios will effectively demonstrate how C5AISTAR may be deployed in real-world settings, highlighting its operational significance and potential benefits.

5.1 Case Study 1: AI-enabled synchronization of joint fires in multi-domain operations

The synchronization of joint fires across land, air, maritime, cyber, and space domains is among the most demanding challenges of contemporary C2. MDOs are marked by compressed decision timelines, contested communications, and adaptive adversaries, conditions under which sequential planning and coordination mechanisms struggle to sustain tempo and coherence [15]. AI-enabled C5AISTAR architectures mitigate these constraints by accelerating decision-making, improving adaptability, and enhancing cross-domain synchronization while preserving commander authority. Within this context, cyber contestation emerges as a deliberate adversary effort to disrupt the digital fires chain by manipulating targeting data, time synchronization, and network availability [16]. In the C5AISTAR workflow, AI fuses cyber indicators with ISR inputs to infer attack objectives and assess mission impact, including increased risk of mis-targeting, delays, or loss of coordination. Commanders are presented with prioritized prevention options, including protection of critical nodes, isolation of compromised segments, alternative communications routing, and data revalidation, supporting fires continuity under human-controlled risk acceptance.

AI-supported joint fires synchronization should therefore be understood as a decision-enabling capability rather than an automation of lethal authority. By integrating sensor data, intelligence updates, operational constraints, and the commander's intent, AI-based decision support dynamically refines course of actions (CoAs). This reduces cognitive overload, strengthens shared situational understanding across echelons, and enables faster, more coherent allocation of combat power, improving tempo control and operational resilience compared to platform-centric C2 approaches.

5.2 Case Study 2: AI for coalition interoperability in multi-national decision environments

Coalition operations represent one of the most demanding challenges for contemporary C2 due to divergent national doctrines, legal frameworks, commander authorities, and technological maturity. These differences complicate synchronization and limit the effectiveness of traditional interoperability approaches that rely primarily on procedural alignment and manual information exchange [17]. AI-enabled C5AISTAR architectures address this limitation by supporting coalition decision-making through adaptive information integration and decision support, rather than through centralized control.

Within this model, interoperability functions as a federative, decision-enabling capability. A critical parallel challenge emerges in cyber threat analysis and prevention, where partners must coordinate defensive actions while respecting national caveats and data sensitivity [18]. The C5AISTAR architecture bridges this gap through federated AI-based cyber threat analysis. The system generates actionable cyber indicators and prevention priorities with confidence levels without sharing raw data. This semi-autonomous approach accelerates coalition-level defense decisions while respecting national reservations and reducing trust asymmetry. The AI-supported environment integrates national cyber data into a common situational picture, enabling rapid consensus and operational resilience even amid hybrid threats.

Operationally, AI-enabled environments enhance shared situational awareness by fusing national inputs into mission-relevant views, enabling faster consensus while preserving national authority. Federated analytics improve resilience and enable rapid resynchronization in response to political constraints, force

availability, or adversary adaptation, capabilities that are critical in high-tempo, hybrid coalition operations.

5.3 Case Study 3: AI-assisted cyber-kinetic synchronization

In contemporary MDO, cyber actions (e.g., disruption, deception, degradation) and kinetic actions are often planned and executed along separate decision pathways, creating temporal and cognitive gaps that adversaries can exploit [19]. Within a C5AISTAR-type architecture, AI serves as an integrative decision enabler, continuously correlating cyber indicators, intelligence updates, and kinetic options across the OODA loop. AI-supported decision tools detect emerging adversary cyber activity targeting friendly C2, ISR, or logistics networks while simultaneously identifying windows of opportunity for kinetic effects [20]. Rather than automating action, AI rapidly generates synchronized cyber-kinetic CoAs, highlights timing dependencies, and assesses second-order effects in line with the commander's intent and legal constraints.

Operationally, AI-assisted cyber-kinetic synchronization reduces decision latency, mitigates cross-domain fratricide risks, and improves coherence under cyber and electromagnetic stress.

Decision superiority emerges not from autonomous action, but from AI-enabled integration and governance of cyber and kinetic decision processes within a unified C2 architecture.

Case studies confirm Hypothesis 3. AI-driven C5AISTAR architectures act as adaptive ecosystems, enhancing synchronization and collaboration. By reducing latency and cognitive load, AI enables dynamic priority reassessment across joint and coalition domains.

Rather than replacing commander authority, it reinforces mission command through shared understanding. This yields faster, more coherent outcomes than traditional C2, validating the system's strategic, operational, and tactical value.

6. RESULTS AND DISCUSSION

The results of this study demonstrate that embedding artificial intelligence as a structural component of C2 architectures produces a qualitative transformation in military decision-making rather than a marginal efficiency gain. he C5AISTAR framework consistently outperformed legacy C4/C5ISR models in terms of decision cycle speed and resilience, even amid cyber disruption and information saturation. These effects emerged not from autonomous decision-making, but from the architectural integration of AI across the OODA loop, where machine-supported sensing, fusion, and prediction stabilized human cognition and reduced analytical bottlenecks. Compared to baseline architectures, C5AISTAR-enabled decision workflows showed substantial reductions in end-to-end decision latency, particularly in environments characterized by cyber disruption, electromagnetic interference, and information saturation. Faster decisions did not result in a loss of commander authority or accountability. AI-supported orientation and option generation improved decision coherence by presenting commanders with prioritized, confidence-labeled CoAs aligned with intent and constraints. This finding supports the argument that decision superiority in MDO is increasingly determined by decision architecture and governance rather than by data volume or platform performance alone. The key to decision superiority is therefore semi-autonomous architecture and governance, which offers a legitimate path for the application of AI in future operations.

From a doctrinal and organizational perspective, the results highlight that AI functions as a socio-technical enabler embedded within C2 processes. Performance gains were inseparable from adaptations in training, leadership competencies, and human-AI teaming norms. C2 superiority is founded on an AI-enabled decision architecture governed by robust control and oversight mechanisms, ensuring explainability, auditability, and the preservation of commander responsibility, while AI-accelerated decision cycles reinforce the

practice of mission command. Without such mechanisms, faster decision cycles can increase the spread of errors, underscoring the central importance of doctrinal control.

The study also highlights the particular value of coalition contexts, where federal AI-supported decision-making products can reduce coordination frictions while respecting national caveats. Although the findings are derived from scenario-based analysis rather than live operations, they provide robust evidence that AI-enabled C2 architectures such as C5AISTAR should be understood as adaptive decision ecosystems. In this framing, decision superiority arises from integration and governance, not from the automation of authority, offering a doctrinally legitimate pathway for AI adoption in contemporary and future military operations.

7. CONCLUSION

This study assessed whether artificial intelligence, when embedded as a structural component of C2 architectures, can enhance decision-making effectiveness without eroding doctrinal legitimacy, commander authority, or coalition interoperability. Building on a doctrine-first, non-engineering analytical approach, the findings demonstrate that AI-enabled C5AISTAR architectures provide tangible improvements in decision speed, coherence, and resilience across strategic, operational, and tactical levels. Decision superiority emerges not from the automation of authority, but from the architectural integration and governance of human-AI teaming across the OODA loop. The analysis confirms that effective AI adoption in C2 requires coordinated adaptation across doctrine, organization, training, leadership, and interoperability frameworks, particularly in coalition environments characterized by legal, political, and technological asymmetries. By framing AI as a socio-technical enabler rather than an autonomous decision-maker, the study offers a reference model for future doctrinal development, experimentation, and multinational standardization, aligned with mission command principles and alliance legitimacy.

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Superioritate în luarea deciziilor prin comandă și control încorporate în AI: cadrul C5AISTAR pentru colaborarea dintre om și AI în operațiuni multidomeniale

Operațiunile contemporane multidomeniu expun limitele arhitecturilor de comandă C4ISR și C5ISR centrate pe om, în special în condiții de saturație informațională și contestare adversară. Acest studiu abordează întrebarea dacă integrarea inteligenței artificiale ca element structural în cadrul comenzii și controlului poate oferi superioritate decizională fără a submina doctrina sau autoritatea de comandă. Acesta introduce cadrul C5AISTAR și aplică o abordare bazată pe doctrină, cu metode mixte, combinând comparația cadrelor evolutive, maparea buclelor OODA și analiza bazată pe scenarii. Concluziile indică faptul că arhitecturile C5AISTAR încorporate cu IA reduc latența ciclului decizional, îmbunătățesc coerența deciziilor și sporesc reziliența în contextele coaliției și civil-militare. Studiul concluzionează că superioritatea decizională rezultă din integrarea arhitecturală și guvernanța echipei om-IA, mai degrabă decât din automatizarea autorității**.**

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