Integration of AI into Tactical Planning Process: Possibilities and Challenges

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Abstract

Integration of artificial intelligence (AI) into military operations and planning processes has become a central focus in modern warfare. The speed and complexity of modern warfare require a rapid, accurate, and adaptive planning process and decision-making capability. Tactical planning process (TPP) provides structured approach, offering guidelines and templates, however, in modern warfare classical planning process does not guarantee a strategic advantage. Conflicts in twenty-first century are thick of data, constantly streamed from various sources and sensors. The situation on the battlefield and emerging threats evolves in real time and space. At the same time, AI offers the ability to observe and analyse information, propose solutions, and assist in orders production. The integration of AI into TPP, therefore, offers both opportunities and challenges, raising questions about reliability, control and credibility.

To properly analyse these questions, two military theories provide valuable guidance. First, John Boyd's OODA loop theory – Observe, Orient, Decide, Act – provides a structured way to analyse decision-making speed and effectiveness. Boyd's theory of OODA loop enables the examination of the planning process as a perpetual cycle that necessitates both rapidity and adaptability [1]. By contrast, Carl von Clausewitz's theory of "fog" and "friction" warns us that conflicts and battlefield always generate uncertainty and disruption, even in the best-laid plans [2].

Together, these theoretical frameworks facilitate the understanding and evaluation of the potential and limitations of AI in decision-making and planning processes.

This essay argues that while AI integration can significantly accelerate the Tactical planning process and enhance the tempo of Boyd's OODA loop, Clausewitz reminds us that the fog and friction of war can only be reshaped – not eliminated. Therefore, AI should serve as a supportive tool – not as a replacement for human judgment, adaptability, and accountability.

Keywords: *artificial intelligence, planning process, decision-making process, battlespace, fog of war.*

Theoretical Framework

To analyse the possibilities and challenges of artificial intelligence integration into the Tactical Planning Process, it is necessary to establish theoretical background that will guide further analysis. Two main theories will frame this analysis: John Boyd's OODA loop and Carl von Clausewitz fog of war and friction. In addition, the TPP itself provides structural approach of planning.

John Boyd's OODA loop, which consists of 4 main parts: Observe, Orient, Decide and Act works as a continuous cycle in which success depends on speed, ability to observe, analyse, decide and act faster than adversary. In modern warfare, where movement, weapons systems and data are highly complex, completing the Boyd's OODA loop in sufficient tempo is essential. Taking into considerations that AI can faster analyse, give advice or even decide gives ability to accelerate the loop [1]. By contrast, Carl von Clausewitz reminds that every age and every war have fog and frictions. The idea of fog and frictions highlights that limited information, changing environment, battlespace or errors can disrupt even carefully prepared plans [3]. This idea remains highly relevant when AI starting being implemented into planning processes. Can AI truly reduce fog and friction, or does it merely change their form?

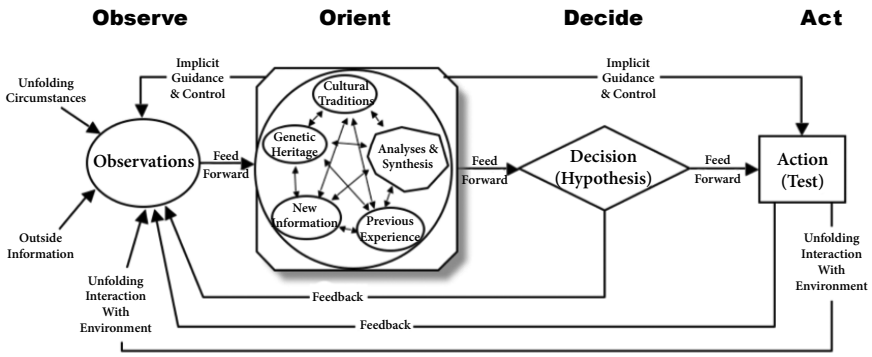

Table 1. John Boyd's OODA loop

Source: [1]

Finally, TPP provides a structural look into planning and decision-making process. TPP consist of seven steps, which are summarized in Table 2, and these steps performed by commanders and staffs gives the framework for producing the operational plan. Planning process and completing of each step can be considerably time intensive. Taking into consideration that planning frequently must be carried out under extreme operational conditions [4]. TPP offers commanders systematic approach from problem identification to execution of order. It gives clarity and structure, but in time-constrained situations, rapid decisions and planning needs to be conducted. And often this process struggles to match the tempo of modern warfare.

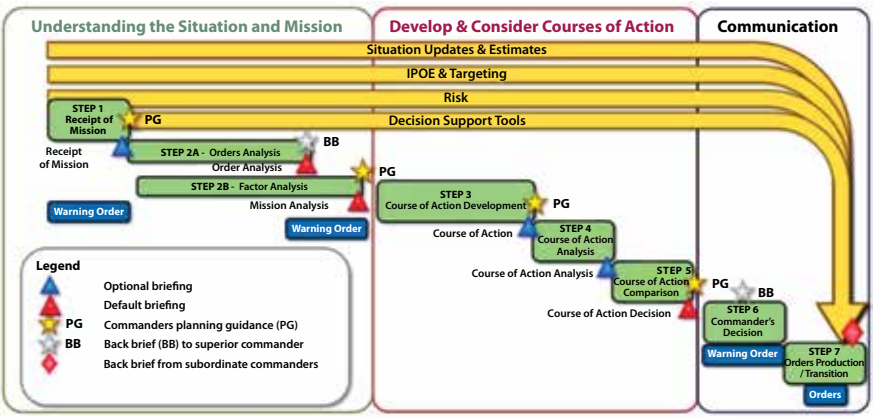

Table 2. Figure 1–5. APP-28 continuous processes map

These theories together provide complementary perspectives: John Boyd's OODA loop emphasis ability to go in speed with modern warfare, Clausewitz underlines uncertainty, and the TPP highlights structural but a highly time-consuming process. Combination of theories offers balance when analysing how AI can be implemented into TPP and that possibilities and risks move alongside this process. With this foundation, TPP can be traced step by step, mapping each step to OODA loop, and analysing how AI might both reduce and reshape the fog of war and friction.

Framing the Problem

Receive of Mission – Observe

Tactical planning process begins with receipt of mission phase. This step strongly correlates with Observe phase of John Boyd's OODA loop. The efficiency and accuracy of this step play a decisive role in shaping staff and commander's initial situational awareness, which directly affects the entire planning process. According to Tactical planning procedures, this step involves several key outputs: initial planning and operation timeline, identification of risks, initial Intelligence Preparation of the Operational Environment (IPOE) products and first warning order for subordinate units [4]. Artificial intelligence technologies offer the potential to accelerate and enhance initial understanding of new mission.

Firstly, D. Stebbins's article underlines that AI tools and systems can automatically generate planning and operational timelines, calculate resources based on higher headquarters (HQ) order. In addition, AI can rapidly process intelligence, surveillance and reconnaissance (ISR) data and fuse it with open-source intelligence. Enabling the rapid creation of preliminary IPOE products [9]. Creating initial products, collecting and systematising given information reduces time needed for generating understanding. Such automation can drastically reduce gap between receipt of mission and initiation of further detailed analysis and planning.

By contrast, at the same time automation can cause notable risks.

As starting point, the integration of large amounts of open-source data may raise questions about accuracy and relevance. Poor quality data or misleading information can create misunderstanding of necessary information in higher HQ order [9]. Understandability in this planning phase is critical, each staff analytics must fully understand the data, which is provided by AI supported tools, question why is crucial for further steps. Secondly, the risk of automation bias. According to L. Kahn article, humans tend to over trust in AI generated content and outputs [12]. That kind of overwhelming trust in AI generated outputs like initial operational or planning timelines can lead to further mistakes in planning. Neglect and insufficient review of initial products can undermine their credibility.

In summary, effective use of AI at first step requires balance between speed and oversight. While AI supported tools can increase efficiency and rapid situation awareness, careful staff planners overview and validation remain irreplaceable to ensure contextual relevance of outputs. Failure to understand and oversee AI generated initial products can result significant misinterpretation of whole mission and intent and that can compromise further planning steps. Nonetheless, the receipt of the mission is only the initial step of TPP, the far complexed and greater challenge lies in orientation phase, where collected data and understanding must be transformed into operational understanding.

Mission Analysis – Orient

If the receipt of the mission provides the raw data for planning, mission analysis (MA) is where it must be turned into understanding. This step corresponds to the OODA loop "Orient" phase, where meaning – data matters the most. The mission analysis step produces several essential products such as the mission statement, specified/implied/essential tasks, terrain analysis, civil considerations, and IPOE products [4]. AI has significant potential in accelerating this process.

In the first instance, AI models demonstrate that data from different sources, such as open-source information, reports, sensors, or even historical data and live weather forecast, can be incorporated into automatically generated terrain analysis overlays (MCOO) and IPOE products [5]. Tools such as COA-GPT can generate enemy (ENY) courses of action (COAs) in seconds implementing doctrinal, ISR information and data provided in higher HQ orders. Furthermore, the Rand study analysis collaborate on mitigating bias in IPOE analysis, tasks identification, constrains and risks. AI can find patterns and connections to support planning [9]. These abilities provided by AI assisted tools notably reduce the time needed to create IPOE products and draw ENY COA's. Identification of risks, assumptions, or constraints not only according given mission, tasks and terrain, but also in relation to historical examples and real-time data, can enormously deepen analysis. Such support provided by AI tools not only accelerates the MA step but also enhance staff planners' deeper understanding and ability to make better decisions in further planning process.

However, the idea that the fog of war in modern TPP remains – even when AI is incorporated – is especially relevant when high tempo and automated product generation are implemented. Human and data biases remain meaningful, as SIPRI's report highlights. Bias in data processing could occur when talking about enemy capabilities analysis, terrain evaluation and especially civil considerations. Some indicators or measurements may be excluded from the system, for example trained tools may work differently in urban and rural environments [8]. Moreover, M. Horowitz study of human and AI based decision making in national security underline the risk of overreliance on AI-suggested ideas. The analysis shows that respondents with the lowest level of self-confidence in their ability to complete task were more likely to accept AI-suggested decisions [7]. This finding shows that if staff members have low levels of self-confidence or limited knowledge, they may accept AI-driven enemy COAs or other products without critical analysis.

In brief, this paragraph shows not only the necessity of

integrating AI into planning process but also hazards of high speed and general understanding. Mission analysis – the orientation phase – depends less on how fast AI can generate products, but more on those products are trusted, understood and easy to understand for planners. AI can help frame and accelerate the situation with predictive models, yet orientation and understanding still demand human intuition that algorithms cannot provide. Once oriented, commanders and staff must move from understanding to action. This begins with generating and evaluating potential courses of action.

Developing and Analyzing Courses of Actions – Decide

In the third, fourth and fifth Tactical planning process step refers closely to Decide part of John Boyd's OODA loop. In these steps commander and staff develop Courses of Action (COAs), analyse developed COAs, compare them and conduct wargaming. Testing their feasibility according to commander given evaluation criteria's [4]. These steps are main part of planning where staff must perform not only intellectually but also show creativity. The quality of products and COAs can directly impact following steps which directly correlate with Act part of OODA loop. At this instance AI tools have potential to accelerate COA development, analysis and comparison.

At the outset, AI has the possibility to generate COAs by combining higher headquarters guidance and commander mission, intent and tasks. Also, automatic tools can implement doctrines and synchronize all joint functions, even optimizing resources (J. Adler, 2024). COA-GPT model have already proven that development of COAs can be fully autonomous and doctrinally consistent [10]. During COA analysis step AI-driven simulations can run thousands of simulated war games, identify weak spots and come up with conclusions. Models can also calculate recourses and optimize consumption, estimate casualty according to each COA. In comparison phase factors for evaluation can be evaluated, strengths

and weaknesses identified automatically, even visualization can be created in the matter of seconds [9]. Due to drastically accelerated processes, staff analysts can analyse conclusions and implement unconventional, creative, human led approaches. Staff do not need to contribute to technical work but can focus on understanding AI driven suggestions.

On the other hand, with advantage of speed and automatization comes and risks. Possibility to be deceived by enemy cyber activities, missing details in generating COAs and human interaction in planning. As Blanchard & Bruun identify in study, AI-generated COAs may be incomplete, some data may be not implemented or even manipulated by enemy deception. These actions can drastically distort the analysis [8]. COAs and wargaming conducted by AI tools are only as reliable as their models, given guidance's and prompts. If adversary behaviour is misinterpreted or the modus operandi have changed according to the ever-changing battlefield and environment the AI offered solutions, or advice could rest on flawed foundations. In addition, research on Human and AI-based decision making in security context shows danger of automation bias, where staff planners overweight AI outputs and begin to lack of analytic point of view [7]. Adversary cyber deception, changing environment and behaviours and possibility to miss analytical or even creative part of COAs can lead to further poorly taken decisions.

In sum, AI tools able to accelerate COA development, analysis and comparison steps by generating, testing, comparing and even advising commander. But AI driven planning cannot replace staff creativity, critical point of view and commander judgement. Predictive models give possibilities, but only staff can add human insights and creativity, weight and human behaviour context. However, TPP not ending at analysis – decide phase. The decision needs to be taken and converted to actions – orders – a point where AI can accelerate actions but also produce additional frictions.

Converting Analysis to Decisions – Act

Tactical planning process sixth and seventh steps – commander's decision and order production – directly align with "Act" phase of Boyd's OODA loop. In these steps planning products and analysis are accepted by commander and translated into clear, synchronized in all joint functions order [4]. At this stage timely taken decision and clearance are critical to conclude planning process and start execution phase. As OODA loop theory shows – time is crucial. And AI can significantly accelerate execution, but final responsibility for action and decisions must remain with commander.

Automated AI tools can generate decision support boards upon commanders' guidance's, recommend course of action and give analysis. Even draft orders by synchronizing previously validated planning products [5]. These capabilities can decrease time between analysis and decision drastically. AI driven support for decision is already becoming vital tool even in business. As Amy M. Jordan highlight in his article AI systems can detect patterns, conclude enormous amount of data from different branches and departments, even predict future trends. All data needed for deciding right can be introduced to decision makers by visualization tools in easily understandable format [6]. This analysis shows that commander decision can be supported by visualized dashboard which can conclude all planning process and analysis from all joint fighting functions. In additions, AI driven tools can support rapid transition from commander decision to order production. And transmitting orders for subordinate units in different networks, enabling units to start acting without any delay.

Despite these advantages, even at this stage of TPP integration of AI can make process faster but also can introduce critical dilemmas. A. Hill and D. Blair describe the "AI-command dilemma", which highlights AI models' possibility to produce fully analysed suggestions that are effective but main problem is that suggestion is fundamentally unexplainable. That makes difficulties for commander to understand how it has approached to that decision

and that's leads to lack of trust or justification. Sophisticated AI calculations and ability to find best solution, especially most created insights, can be clashing with human logic [11]. As a result of this dilemma, commanders and staff need to take tough decision – to trust and agree on not fully understandable COA and plan or reject support and be overrun of adversary faster decision-making process.

Ultimately, it is hard to argue that AI can speed decision-making, but responsibility for action must remain in commanders' hands. Staffs oversight, trust and ability to understand AI driven suggestions remain indispensable. Altogether, these possibilities and issues illustrated in TPP are neither amplifier nor replacement of staff or commander – it's a force multiplier, accelerator for planning. This tension sets a stage for concluding discussion of integrating AI into TPP.

Conclusions and Recommendations

The integration of artificial intelligence into Tactical planning process presents both opportunities and complex challenges. This essay demonstrates remarkable potential of AI to accelerate TPP, which is necessary for modern warfare. Table 3 illustrates TPP as outlined in APP-28, with the author's proposed link to OODA loop and AI's potential role in the planning process. In receipt of mission phase, AI can offer increased efficiency and build rapid situational awareness according received information and open sources analysis. In the Orient phase, the second step of TPP, AI integration helps to frame and create IPOE products and generate enemy COA's according to doctrines. In the Decide phase, friendly forces COAs generation, analysis and comparison conducted by AI can not only expedite process but also synchronise all joint functions and even optimise resources. Finally, in the Act phase, AI driven tools support commanders by creating dashboards with concluded information from planning process thus enabling commander to well-informed and optimal decision. Even after a decision is taken AI still can be implemented in orders productions and sharing

orders to subunits. This potential promise to magnify operational and planning tempo which are crucial in dynamic environment of modern warfare.

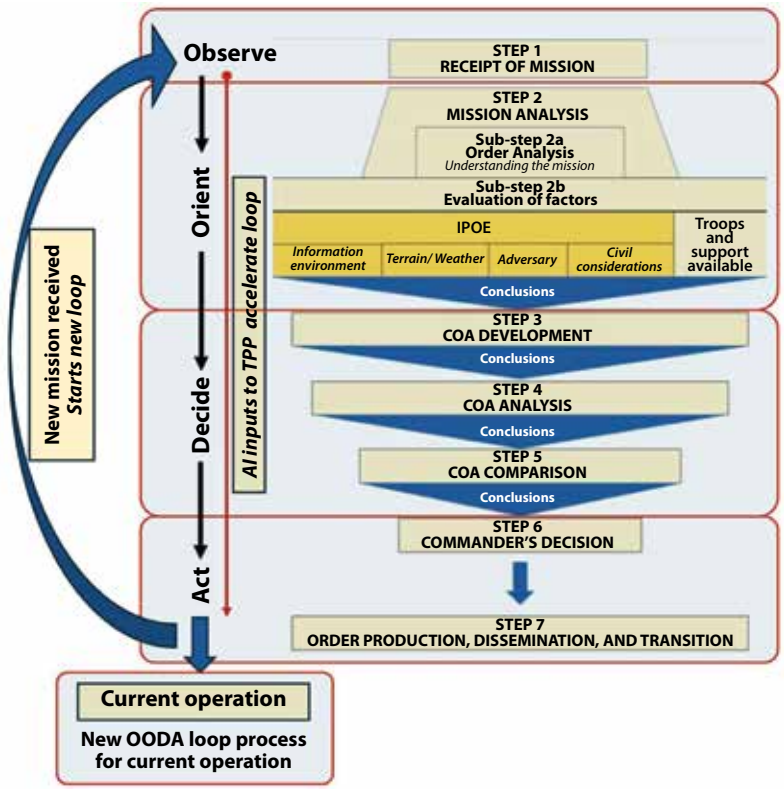

Table 3. Author's interpretation of TPP link with OODA loop and AI integration (based on APP-28, Figure 1–4)

Despite these advantages, Carl von Clausewitz's idea of fog and friction remind us that uncertainty and frictions cannot be eliminated – they only can be merely reshaped. Integration of AI into each TPP step comes with different challenges such as overreliance, human bias, lack of creativity, cyber security, incomprehensibility and AI-commander dilemma. Provided analysis shows that understanding of AI capabilities and processes among commanders and staff is crucial. Across every step of TPP, the benefits are closely connected with challenges and risks.

Ultimately, AI in TPP should be viewed as a supporting tool – as force multiplier that can only work with well-trained and educated personnel. Effective integration depends on careful staff and commander oversight, understanding of AI-generated outputs and commander ability to decide. Each step can be improved and accelerated, but needs of human interaction cannot be replaced – creativity, moral responsibility and capacity of judgment are vital. The question, therefore, is not whether to adopt AI in planning, but how to do so intelligently – leveraging its strengths while preventing from its vulnerabilities.

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