

# Best practices of computer-based simulation to support wargaming in NATO

**Abstract** — NATO is investigating wargaming techniques and their enhancement with computer-based simulation to provide current forces with improved means for analysis and assessment. NATO decision-makers need to be ready to face the current warfare scenarios, characterized by rapidly evolving landscapes, large amounts of diverse information, and intricate interactions. Wargaming has proven to be a very effective method to stimulate and motivate decision makers, analysts, and advisors on alternative and creative thinking. With its correct application and its combination with computer-based simulation, NATO aims at boosting the fidelity of better-informed decisions in areas such as planning and assessment. To achieve its goal, NATO is analysing the current state and best practices regarding the use of simulation supporting wargaming within the NATO Allies. The outcome of this analysis will help to identify the ideal future state.

## 1 Introduction

Warfare scenarios that military forces currently face are characterized by a large set of factors. These factors includes, among others, constantly and rapidly evolving landscapes and situations, large amounts of information coming from many and various sources, or complex and intricate interactions between military and non-military factors covering the PMSEII dimensions (Political, Military, Social, Economic, Infrastructure and Information).

The high degree of uncertainty on the available information or the incapacity to obtain it beforehand put the military forces in a situation in which they need to streamline interoperability, flexibility, agility or resilience. Preparedness, readiness and the response capability of military forces should seek for Command and Control structures able to operate and adapt remaining fit-for-purpose even in case of last minute events.

NATO is already underway to set the conditions for success in increasingly challenging future operations, identifying key enabling elements required to achieve the desired level of readiness and response. In this sense, NATO is searching for methods and tools that promote alternative, critical and creative thinking for strategic and operational planning and informed decision-making [1].

Due to its well-known and accepted benefits, NATO is investigating wargaming as a methodology to encourage alternative thinking for planning and assessment. To date, wargaming potential is well recognized, and when correctly applied allows exploring possibilities, discovering unintended consequences, or managing risk in a safe-to-fail environment [2].

According to the above-described goals, this paper investigates how to take the use of wargaming to its full potential, and combine it with the use of computer-based

simulation. Exploring how to provide a more efficient framework for decision makers, in which more effectively immerse them within the holistic scenarios that increasingly have to face when planning and assessing military capabilities.

This work is structured as follows; Section 2 briefly describes the four wargaming techniques considered in this work. Section 3 elaborates the areas of best practice. Finally, Section 4 draws the conclusions elicited at this state of the work.

## 2 Wargaming Techniques

Covering the full spectrum of the wargaming continuum, from those exploring qualitative concepts to those exploiting quantitative information, this exploratory work initially considers the following four wargaming techniques: seminar games, matrix games, Course of Action (CoA) wargames and analytical wargames.

On the side of the more exploratory techniques, this work investigates on the use of computer-based simulation for supporting seminar games [3] and matrix games [2]. With some differences between the two techniques, neither seminar games or matrix games are devoted to determine winners or losers, but to encourage discussion amongst the participants to gain insight or create narrative on a given scenario with the aim of learning the impact and effects of the decisions taken.

On the other hand, CoA wargames [4] or Analytical wargames [5] are designed to collect and analyse data from wargame play, in some cases serving as a foundation for computer-based combat simulation analysis. Staff officers simulate how they believe a course of action, an operation or a concept will unfold from a friendly and enemy perspective. The overall goal is to identify shortcomings on plans or concepts that the enemy might exploit adjusting original CoAs, plans or concepts according to these findings.

### 3 Areas of best practice

Based on previous experiences of the authors [6] this work identifies best practices in areas such as stakeholders, culture, materiel, data or processes. Investigations on each of them help to identify actions to be taken by NATO across the whole spectrum of the DOTMLPFI (Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities and Interoperability) framework for capability development. This exploratory work considers also other areas such as Finance, Relationships, Efficiency, Effectiveness, Innovation and Information; which are not overtly covered by DOTMLPFI.

The implementation of wargaming techniques sit together around the table a number of stakeholders with different perspectives on similar scenarios and a variety of cultural backgrounds. This is one of the many factors that makes wargaming processes extremely challenging. The needs and expectations of all the different groups have to be fulfilled.

When talking about supporting wargaming with computer-based simulation, materiel and data come upon the scene with the initial aim of facilitating the execution process of the wargame but bringing more and new challenges that has to be effectively addressed to not spoil the objectives, results and player's experience on the wargaming.

To deepen on best practices for computer-based simulation, this work further develops these areas following the guidance given in [7] emphasizing on aspects like conceptual modelling, model confidence and Verification, Validation and Accreditation (VV&A), use of standards, interoperability, execution performance, user friendliness and accessibility and SW engineering and reliability.

From the more technical aspects to the more conceptual ones, all of them play critical role when applied to wargaming. Technical correctness and model confidence of the used tools has to be ensured through VV&A processes. Interoperability, use of standards or SW reliability help on reusability of trusted models speeding up the implementation of wargames. Finally, and bearing in mind that the final decision makers are always human beings, user friendliness and accessibility to the results should come along with transparency to the users on the results helping them on understanding the intricate relationships of the factors affecting their decisions.

### 4 Conclusions

This work aims to provide information about the needs and requirements of NATO regarding the use of

computer-based simulation and other advanced technologies to support and inform wargaming.

These needs and requirements are quite new, as the use of simulation for supporting other domains than training within NATO has been recently realised and it has not been yet implemented. This is, therefore, a great opportunity to inform the community and sowing the seeds to broaden the scope of the military uses of M&S.

To conclude, it has to be kept in mind that there is no way to predict the future, but there are available means that help to recreate possible scenarios and wargame on them eliciting knowledge and creating better understanding.

### References

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