FÜHRUNGSAKADEMIE DER BUNDESWEHR

GENERAL / ADMIRAL STAFF OFFICER COURSE

NATIONAL 2004

WARGAMING

-

GUIDE

TO PREPARATION

AND EXECUTION

Authors:
Birnstiel, Marc; Kämmerer, Michael; Kern, Stefan; May, Thomas; Noeske, Andreas; Reershemius, Ingo; Seglitz, Christoph; Walther, Marc-André

Mentor:
Commander Thomas Boehlke

Translation of english version:
1. Bundessprachenamt HÜRTH
2. Squadron Leader Kevin Byron, RAF (ret.)

Publisher:
Bundeswehr Command and Staff College
Manteuffelstrasse 20
22585 HAMBURG
GERMANY

Copyright © 2006 Führungsakademie der Bundeswehr, Hamburg
ISBN-10: 3-9811105-1-X
ISBN-13: 978-3-9811105-1-7

PREFACE

In view of the fact that wargaming is a very complex issue, these guidelines have been developed to acquaint you with all relevant aspects of this specific element of military training and education. To this end, we have included all relevant definitions and describe the objectives to be attained. Moreover, the planning process with its prerequisites and preparatory work is covered by the guidelines. It goes without saying that the conduct of wargaming exercises and the analysis of the results obtained are addressed as well. Thus, the staff officer employed at the operational level of command is given comprehensive assistance and guidance throughout the entire wargaming process. Apart from that, wargaming is a method which can also be efficiently used at the tactical level of command, when appropriately adjusted to the specific requirements of this level.

Given the complexity of multinational joint and combined operations, wargaming as a means supporting analysis in planning processes at the operational level of command has regained its traditional significance. In the following the emphasis will be put on manual wargaming, which is closely related to computer-simulated wargaming. Thanks to the development of simulation models - in particular in the economic sector -, high-resolution military simulation models are becoming increasingly available for combined operations and for operations conducted by the individual services. These models are particularly valuable when it comes to representing symmetrical conflicts, where quantifiable military force components fight against each other. These force components can be defined quite exactly in terms of time and space using computer-based programmes. This kind of calculability is lacking in the lower part of the conflict spectrum and even more so in asymmetrical conflicts. Nevertheless, very promising simulation models are being developed in this domain, too. Still, manual wargaming offers certain advantages in these types of conflict and should thus be preferred in this context. For instance, only manual wargaming ensures that the “human factor” and intangible, non-quantifiable parameters can be appropriately taken into account. Therefore, the ideal approach would include both methods – manual and computer-based wargaming — as mutually complementing parts, which may be used in parallel.

These guidelines take up the success story of wargaming. However, they also take account of the new historical conditions and have therefore been given a new programmatical and methodological orientation. In this context, it is very important that we successfully close the knowledge gap in the Bundeswehr, which results from the lack of wargaming training during the Cold War period. While in NATO and many allied armed forces wargaming has been re-established as a permanent element of the operational planning system, it is still in its infancy in our armed forces. Against this background, the guidelines can be considered an attempt to revive a forgotten art and to restore the role wargaming deserves as a tool for preparing decisions. At the same time, the guidelines should also be considered an attempt to initiate steps which may re-establish the necessary expertise in the Bundeswehr. Therefore, we more than appreciate the authors’ core work. Having successfully avoided creating a

run-of-the-mill product, they developed a really practice-oriented guide for classroom learning and for application in everyday operational planning.
However, wargaming does not replace the personal decision-making skills of the military leader. Nor can it be considered a substitute for leadership and management experience or the ability to involve surprising situation developments adequately in the operational decision-making process. Therefore, wargaming must not be considered to be some kind of formula which relieves the military leader from his personal responsibility in the planning and conduct of operations. Nevertheless, we should use it as a valuable tool which efficiently supports military planning and operational command and control.

Helge Hansen
General (ret.)

TABLE OF CONTENTS

INTRODUCTION 1

1. **What is Wargaming** 2

1.1 Definition 2

1.1.1 Wargaming 2

1.1.2 Operational Analysis 3

1.1.3 Computer-Based Wargaming 3

1.1.4 Manual Wargaming 3

1.2 The Aim of wargaming 3

1.3 Scope and Golden Rules 4

1.4 Scope of Application for the Guide 5

2. Preconditions 6

2.1 Training / Training Materiel 6

2.2 Necessary Decisions 6

3. Preparations 11

3.1 Instruction Briefing on Wargaming 11

3.2 Personnel 12

3.2.1 Executive 12

3.2.2 Support 13

3.2.3 Blue Cell 13

3.2.4 Red Cell 14

3.2.5 White Cell 14

3.3 Premises and Presentation Media 14

3.4 Processing of COA and OPFOR COA 14

3.5 Operational Analysis During Preparation 16

4. Execution of Wargaming..... **18**
4.1 Structure of Execution..... **18**
4.2 Introduction to the Theatre Situation..... **19**
4.3 Introduction of COA and OPFOR COA..... **19**
4.4 Structure of the Cycles..... **19**

5. Evaluation..... **23**
5.1 Assessment of the Individual COA..... **23**
5.2 Comparison of COA..... **23**

6. Appendix..... **28**
6.1 Bibliography..... **28**
6.2 List of Abbreviations and Acronyms..... **30**
6.3 List of Figures..... **31**

Annexes:

A Operational Planning in Accordance with the GOP..... **A-1**
B Task Descriptions..... **B-1**
C Area Organization and Situation Display..... **C-1**
D Recording Information..... **D-1**
E Operational Analysis (OA) Support..... **E-1**
F CD (Enclosed)

INTRODUCTION.

Wargaming, as we understand it today, is an analysis technique and is used to assess friendly *courses of action*. The basic principles of wargaming are not used exclusively in the military sector, but also in economy and politics. The long history of wargaming dates back to the "Kriegsspiel" (war game) of the Prussian military in 1811. At that time, Leutnant Johann von Reisswitz created a set of rules which allowed to show the movements of forces from battalion up to army level in sandboxes for two opposing parties. Due to the later improvement of the rules and the use of topographical maps, wargaming evolved into an instrument for the preparation of military decisions. As it was possible to analyze complex movements and battles in terms of time and space, various armed forces integrated this principle into their planning processes. Both in the Reichswehr and the Wehrmacht, wargaming was an integral component of the military planning process. During the Cold War, the armed forces of most NATO member states hardly applied wargaming. In the Bundeswehr, wargaming completely sank into oblivion although the knowledge had initially still existed. Prompted by the USA's very positive experience with wargaming during the Gulf War (1990-1991) and the rapid development of simulation programs, wargaming became an integral part in the planning process of NATO and many allied armed forces. Today, wargaming is used to prepare and conduct operations in the entire task spectrum of forces.

Basing on the Bundeswehr Concept, future Bundeswehr operations will predominantly take place within the framework of NATO or international alliances. Therefore, it is necessary for the Bundeswehr to train personnel for participation in the NATO planning process. This includes, among other things, the capability of using wargaming. This guide is intended to create the prerequisites for learning wargaming (anew). In the first chapter, the concept of wargaming is defined and explained. Then the structure of the guide has been adapted to the structure of wargaming. So it describes prerequisites, preparations, execution and evaluation. The guide was developed within the framework of a term paper for the National 2004 General/Admiral Staff Officer Course at the Bundeswehr Command and Staff College. It is primarily intended for headquarters that conduct operational planning basing on the NATO „*Guidelines for Operational Planning*" (*GOP*).

To avoid confusion with regard to language and, resulting from this, contents, English GOP terms with a fixed meaning were not translated in the German version, but printed in *italics*.

1 WHAT IS WARGAMING?

1.1 **DEFINITIONS.** The *Operational Planning Process (OPP)* in accordance with the GOP provides a standardized planning procedure which, by means of logically successive steps, is used to develop an implementable *Operation Plan (OPLAN)* from a political or military-strategic directive to ensure the achievement of the desired military end state. Wargaming is an integral part of the *OPP* (a summary of the *OPP*, as per *GOP*, can be found in Annex A). The *OPP* consists of 5 stages. Figure 1-1 shows in which stages wargaming can be applied: Wargaming is regularly used in Stage III "*Concept Development*" to compare *COA*. Additionally, it can be used in other *OPP* stages. Then, however, its purpose would not be comparison, but development, improvement, or revision of *COA*. Besides being used in operational planning, wargaming is also applied as a dry run in the *Mission Rehearsal*.

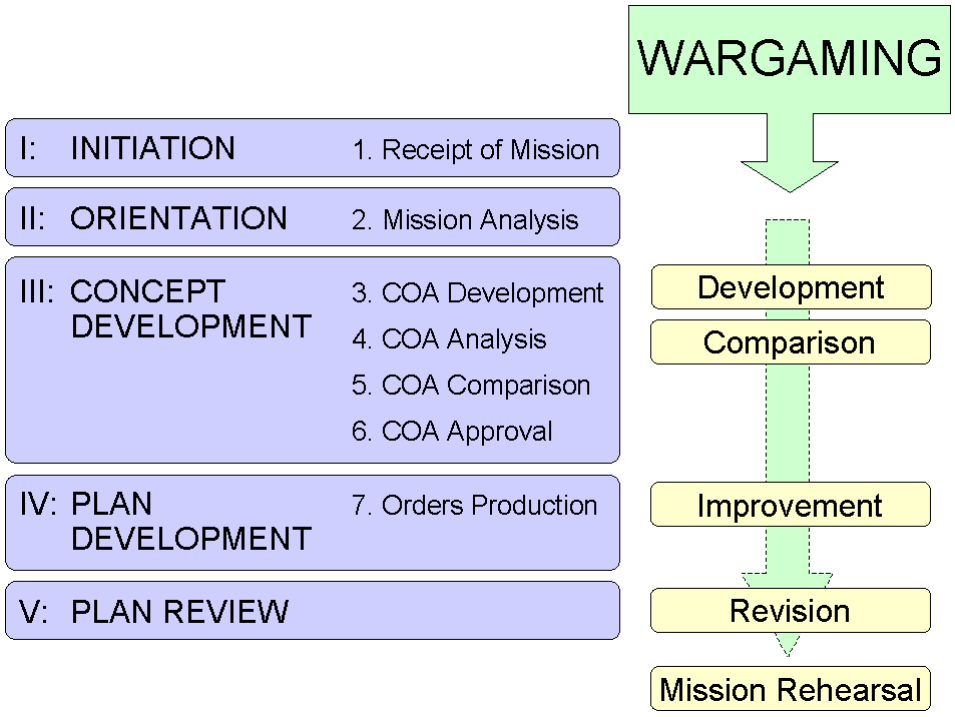

Figure 1-1: The *OPP* stages and areas of application of wargaming

For wargaming, prognoses on effects and movements of forces in time and space are necessary. The complexity of such prognoses in contemporary operations makes the support and integration of Operational Analysis (OA) into the *OPP* mandatory. To ensure a common understanding of the terms wargaming and OA, both concepts need to be defined.

1.1.1 Wargaming. Wargaming is a flexible instrument designed to develop, compare, and improve *courses of action* (*COA*). It is a structured process which compares the friendly *COA* with the *opposing forces COA (OPFOR COA)*. The different procedures and sequences of measures in *COA* and *OPFOR COA* are represented by two parties. The use of two parties takes the human factor in the decision-making process into account. Thus wargaming corresponds with the

Clausewitzean idea that war, in a figurative sense, is the clash of opposing wills.

1.1.2 Operational Analysis. OA includes not only the development and application of mathematical models, statistical analyses and simulations but also the application of expertise and experience in determining quantitative factors for the friendly and the enemy's conduct of operations. OA is intended to improve operational planning and combat service support. Thus it supports strategic and operational decision-making processes. Mathematical models and simulations form the core of OA. The results derived from them are interpreted by experts. If looked at separately, the resulting prognoses represent only a limited basis for decisions. They rather indicate trends and tendencies. The quality of these trends and tendencies depends on the quality of the initial factors. Reality is simplified by the used models. This is especially true for asymmetrical scenarios.

1.1.3 Computer-Based Wargaming. In computer-based wargaming, the comparison of *COA* and *OPFOR COA* is exclusively done using simulation models. Computer-based wargaming requires extensive IT resources. The results still need to be interpreted by experts.

1.1.4 Manual Wargaming. Manual wargaming describes the comparison of *COA* and *OPFOR COA* as an interaction between two parties. This way, it is easier to make the human factor and the related decision-making process for the conduct of operations visible. Manual wargaming also requires support by OA.

1.2 **THE AIM OF WARGAMING.** Through wargaming, information on advantages and disadvantages, the amount of coordination and risks of the *COA* to be analyzed can be gained. Among other things, wargaming has the following functions:

- It explains the sequence of a planned operation's steps in time and space,
- it shows the required amount of coordination between forces and/or sub-operations,
- it substantially contributes to synchronizing the elements of an operation,
- it contributes to determining the necessary friendly capability profile and the strength of forces,
- it identifies critical phases and areas of the operation,
- it identifies the major elements of the concept of operations.

1.3 **<u>Scope and "Golden Rules"</u>.** Wargaming includes the following steps:

- Creation of the conditions for the application of wargaming (Chapter 2),
- preparation of personnel, infrastructure and working documents (Chapter 3),
- execution of wargaming (Chapter 4),
- evaluation of collected information (Chapter 5).

Execution is the central step of wargaming. This step is carried out in sequences consisting of cycles with the move of "Action" - "Reaction" - "Counteraction" (Figure 1-2).

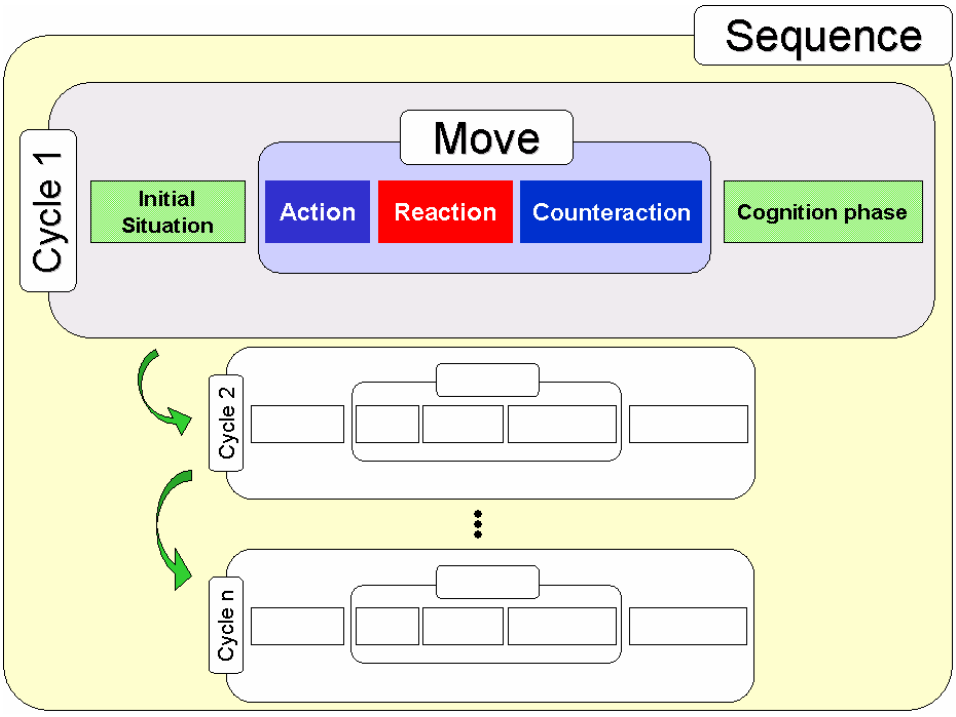

Figure 1-2: Structure of Wargaming

For the execution, *COA* and *OPFOR COA* are divided into time segments which are to be looked at in one cycle each. At first, the setting for this cycle is described. In the subsequent movement, the "Action" of party A is followed by the "Reaction" of party B, which in turn is followed by the "Counteraction" of party A. The findings are then thoroughly examined in the cognition phase. This basic cycle consisting of *Setting - "Action" - "Reaction" - "Counteraction" - Cognition phase* is run through until all time segments to be analyzed have been covered.

The execution is a strict, disciplined process with unambiguously defined functions and rules for usage. Principally, the following “golden rules” apply:

- Assumptions and conditions previously determined in the planning have to be strictly adhered to,
- All participants have to follow the set schedule,
- wargaming is a stringent comparison of *COA* and *OPFOR COA* and thus **not a competition** between staff members,
- wargaming is not to be used to justify or defend individual *COA*,
- wargaming is a process, not a forum for discussion. It serves for the presentation and collection of facts. It is important to keep an unbiased and objective perspective and not to jump to conclusions,
- the necessary resolute and stringent direction must not lead to forcing the participants to confirm a *COA*,
- during wargaming, all results have to be documented in an understandable manner,
- all friendly *COA* have to be looked at by means of wargaming before selecting the most promising *COA*.

1.4 **SCOPE OF APPLICATION FOR THE GUIDE.** In the following, this guide looks at manual wargaming at the operational level for the comparison of *COA* during the Stage III *Concept Development* of the *OPP*. However, it can be transferred to the other areas of application (Figure 1-1).

2 **PRECONDITIONS.** For the staff to successfully apply wargaming during an operational planning task, it is absolutely necessary that three conditions are fulfilled: Firstly, the staff is trained in the use of *OPP* (*OPP* training is not subject of this guide). Secondly, the staff is trained in the use of wargaming. Thirdly, by means of decisions and definitions, wargaming has been adapted to focus on the goal so that it contributes to finding a solution for the friendly operational task.

2.1 **TRAINING / TRAINING MATERIEL.** Before starting with wargaming, a common understanding of goal and purpose, preparation, execution and evaluation has to be created. To gain first experience in the use of wargaming, a symmetric warfare scenario is more suitable. This guide is intended both to ensure guided self-study and to enable the teaching of assigned direction and duty personnel. In case of initial training, the key personnel (director and coordinator) have to be experienced soldiers. Moreover, a demonstration would be useful. For teaching purposes, the following material is included in this guide:

- A PowerPoint presentation that informs about goals and purpose, explains necessary preparations and describes the basic structure of wargaming. Thus it is possible to convey a basic understanding of the wargaming procedure and an idea of the different functions in wargaming (Annex F: CD Briefing “Wargaming as Training Support” – german version only),

- A PowerPoint presentation to prepare wargaming personnel and the *Joint Operational Planning Group (JOPG)* for their wargaming (Annex F: CD Briefing “Introduction to Wargaming” – german version only).

2.2 **NECESSARY DECISIONS.** When dealing with friendly tasks, wargaming has to be adapted to the goals by means of a number of decisions and definitions. On the one hand, these decisions and definitions limit wargaming with regard to the way of execution and the method to be used, on the other hand, they determine to which extent the *COA* may be changed during wargaming. As wargaming is part of the operational planning process, some of the decisions and definitions have been given or made by previous planning steps of the *OPP*. In the following, decisions and definitions are listed according to the order in which they have to be made in systematic processing of the operational planning process:

2.2.1 When setting up the *JOPG*, the coordinator for wargaming has to be appointed. He will be responsible for the preparation of wargaming in terms of contents and organization (a description of additional tasks can be found in Chapter 3).

2.2.2 Scope and efficiency of OA have to be agreed upon between the coordinator, the head of *JOPG*, and the OA experts. Only if the planning process is accompanied by OA from the very beginning, the prognoses can be used to support wargaming. The type of thematic report an OA cell can provide substantially depends on its capacity, equipment and experience. In symmetrical scenarios, OA can provide

more support than in asymmetrical scenarios as quantifiable factors can be determined more easily and precisely in Force on Force scenarios. The physical and virtual factors (such as the stability of a government, the effect of an information campaign, etc.) in asymmetrical scenarios, in contrast, can be quantified only to a limited degree.

2.2.3 *Constraints/Restraints* for the friendly conduct of operations as well as for the opponent's assumed conduct of operations have to be identified, made available for wargaming and followed.

2.2.4 With the approval of the head *JOPG*, the coordinator decides which method will be applied. At operational level, the following methods are used: *Wargame Phases, Wargame Segments of the Battle Space*, and *Wargame Decisive Points*. Upon the selection of the method, the *COA* are divided into time segments which will then be analyzed in cycles. The way the time segments are defined depends on the method:

- *Wargame Phases* (Figure 2.1). Wargaming of one or more time segments of a *COA*. This method is most frequently used. For the subdivision of the *COA* into segments, two procedures are available: The simple one would be to divide the *COA* into segments with fixed time intervals, e.g. one segment corresponds to one week or two. These segments are identical for all *COA* and *OPFOR COA*. Another possibility would be to divide the *COA* into segments with flexible time intervals that correspond to the operational steps. These, however, vary for the *COAs*, and a time-related comparison is difficult. For this procedure, it should be kept in mind that the comparison of *COA* in the *Decision Briefing* is based on contents that were viewed in different ways.

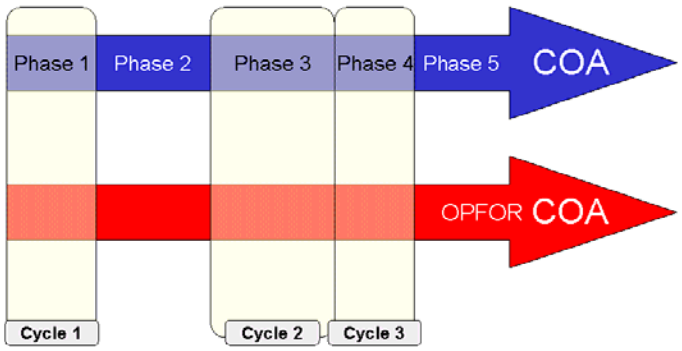

Figure 2-1: *Wargame Phases*

- *Wargame Segments of the Battle Space* (Figure 2-2). Focus on a geographic area in which a certain operational effect is to be achieved. For the subdivision of the *COA*, it has to be decided which areas of the *Joint Operations Area (JOA)* have to be analyzed. Then, every area has to be assigned the time segments that are to be analyzed. Examples for areas to be

analyzed include urban hot spots, straits, sea or land lines of communication.

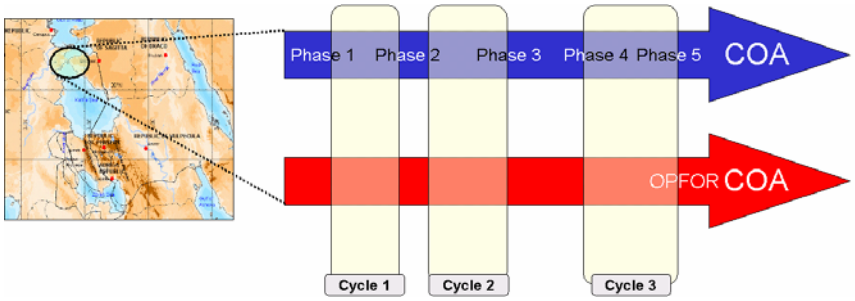

Figure 2-2: *Wargame Segments of the Battle Space*

- *Wargame Decisive Points* (Figure 2-3). The analysis covers the conduct of operations at one (or more) *Decisive Point (DP)* or the interval until this condition is reached. First, the *DP* to be analyzed are determined for subdividing the *COA*. After that, these *DP* are either looked at either in one time segment or - to increase the degree of detail - in several time segments.

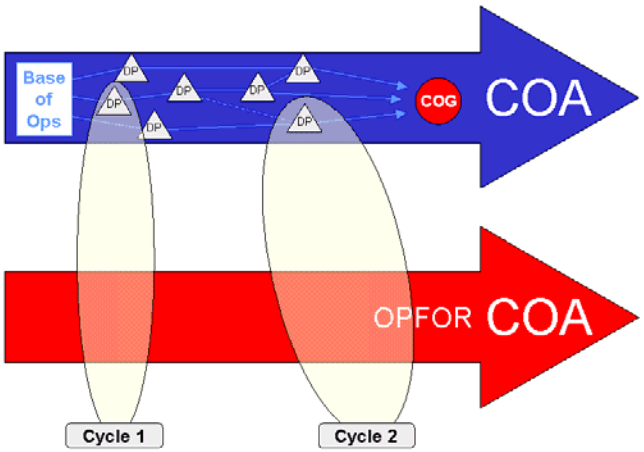

Figure 2-3: *Wargame Decisive Points*

When planning *Crisis Response Operations (CRO),* due to the limited time available, it has to be thoroughly selected which method will be used to analyze which segments. The time segments should be chosen in a way that allows to examine those operational phases in which the *COA* fundamentally differ or which are especially critical for the overall conduct of operations.

2.2.5 The *COA* represent the actions of different command levels with their capabilities. After selecting the segments to be analyzed, it needs to be determined which command levels and Joint Functional Areas (e.g. CIMIC, PSYOPS, intelligence collection and reconnaissance) have to be looked at in wargaming. This decision has a vital effect on the time for preparation and on the duration of the wargame as all command levels and Joint Functional Areas have to be displayed in one cycle.

When determining the command levels to be looked at, it needs to be ensured that the required degree of abstraction is maintained. At the level of the *Joint Force Command (JFC),* joint and combined operational planning is conducted. Therefore, the subordinate levels may be displayed only to the extent necessary for the analysis of the *COA* segments. The basic idea is that one command level below the *JFC* should also be considered. Special cases, such as the employment of Special Forces, or if lower command levels have to be considered as well due to multinationality, specific political conditions or an employment of special contingents, represent an exception.

2.2.6 An essential decision is the selection of the *Commander's (Cmdr's) Selection Criteria* as these criteria form the yardstick for the assessment of the individual *COA*. These criteria have to be defined in the *COA* update briefing at the latest. Examples for *Cmdr's Selection Criteria* include:

In symmetrical scenarios:

- Flexibility,
- operational tempo,
- surprise,
- operational risk,
- simplicity.

In asymmetrical scenarios:

- Stabilization of the theater country,
- isolation of terrorist groups from extern support,
- risks to hostages, refugees, etc.,
- flexibility for the response at an escalation of the situation.

2.2.7 The format of details on time and place has to be defined.

2.2.8 Only during the comparison of *COA* (see Figure 1-1) can it be decided whether or not the *COA* may be altered during the wargame. Even though an improvement quickly results in a higher quality of *COA*, this does, however, require an experienced staff to examine the following segments basing on the changes. The comparison of individual wargaming sequences becomes more difficult then.

2.2.9 Criteria that lead to the termination of a wargaming sequence have to be determined in close coordination with the commander. These criteria define conditions under which the mission cannot be accomplished any more even if the *COA* was changed. The *COA* concerned will then be abandoned and not be introduced in the *COA* Decision Briefing. Examples for such breakup criteria include:

- Major elements of the friendly *Center of Gravity (COG)* have been eliminated,

- mission accomplishment is impossible due to an insufficient number of forces or assets,

- the given time frame for mission accomplishment has been exceeded.

3 **PREPARATION.** Apart from the prerequisites mentioned in the previous chapter, goal-oriented and comprehensive preparatory measures play a decisive role for the success of wargaming (Figure 3-1).

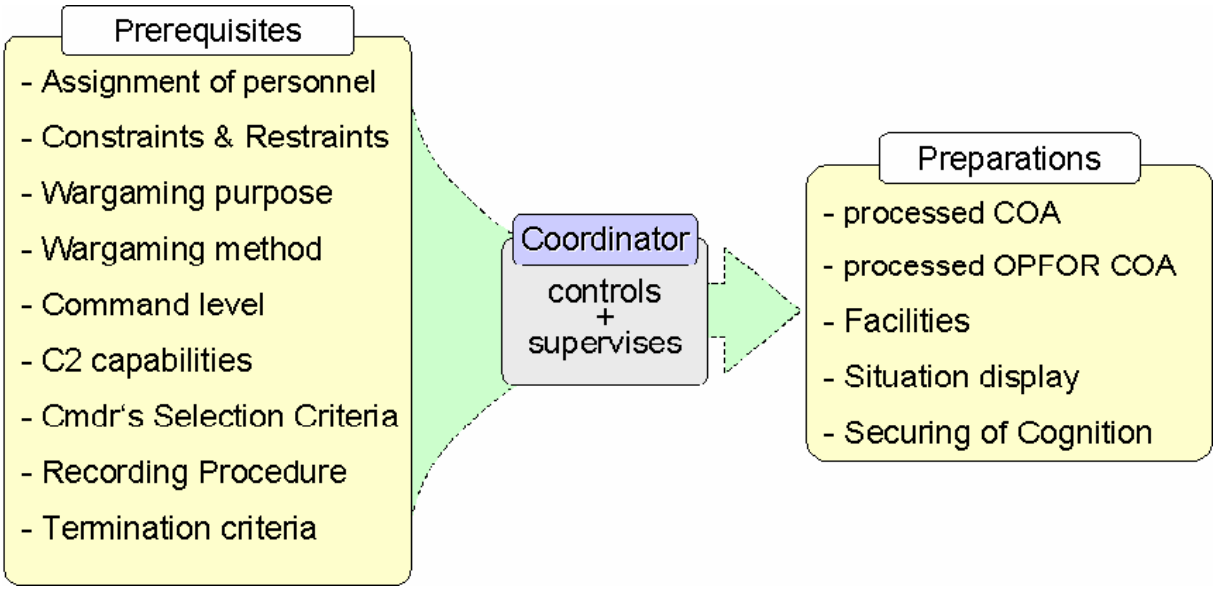

Figure 3-1: Preparation and its Results

3.1 **INSTRUCTION BRIEFING ON WARGAMING.** After the *COA Update Briefing*, the participants of the wargame and the required duty personnel will be assigned by the coordinator. Then, the coordinator will instruct the personnel on preparation, execution and evaluation. For that purpose, he will use the "Wargaming Instructions" which comprise the following areas (a sample of the Instruction Briefing on Wargaming can be found on the CD enclosed):

- Decisions and definitions (see Chapter Preconditions),
- information, which *COA* and *OPFOR COA* have to be looked at during the execution of wargaming,
- segments to be analyzed,
- briefing of personnel on their corresponding functions or functional areas,
- place, time and anticipated duration of the wargame,
- processing of *COA* and *OPFOR COA*.

3.2 **PERSONNEL.** Personnel have to be assigned to the following functional areas (Figure 3-2): (cf. Annex B Task Descriptions)

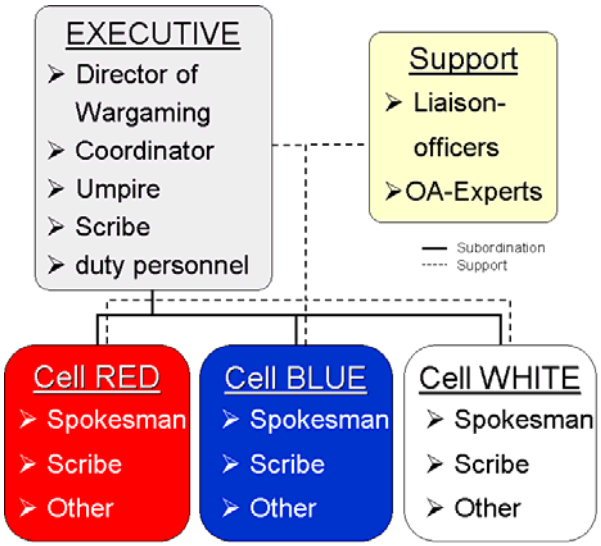

Figure 3-2: Participants

3.2.1 Executive.

3.2.1.1 Director of wargaming.

- Bears overall responsibility,
- briefs on basic situation, if necessary,
- determines initial situation,
- processes the cycles in terms of contents, but shall remain in the background in order to keep track of the wargame,
- documents results in the cognition phase.

3.2.1.2 Coordinator.

To be appointed at the beginning of the planning process upon the setup of the *JOPG* and will be responsible for the wargaming from then on.

- Obtains all decisions and makes necessary definitions,
- ensures preparation,
- supervises the adherence to decisions, definitions (e.g. timelines), and rules during the execution,
- coordinates the employment of the duty personnel.

3.2.1.3 Umpire**.** The arbitrator is tasked with making final decisions for situations, in which the effects of measures cannot be clearly determined. In his role, he supports the director in stringently achieving the goal of the wargame. At the operational level, decisions by the arbitrator are usually rarely needed.

3.2.1.4 Secretary. The secretary keeps the records of the synchronization matrix. Entries in the synchronization matrix are made upon order of the director.

3.2.1.5 Duty personnel. Other duty personnel will perform general tasks. These tasks may include necessary reconstruction measures, change of maps or overlays, activities with maps, or work with a PC. The number of personnel as well as training or briefing depends on the local requirements and the availability of personnel.

3.2.2 **Support.**

3.2.2.1 Liaison Officers. The liaison officers of subordinate levels (at the operational level, this would be representatives of the *Component Commands (CC)* or comparable levels) will be assigned to the *JOPG* as liaison elements upon buildup in order to represent interests, intentions and conduct of operations during planning. Prior to the wargame, the liaison officers have to develop all necessary simulation and trend forecasts in cooperation with OA on behalf of the *JOPG*. During the wargame, they have an advisory role and will be consulted upon order of the director, if necessary, to explain details of their respective operational planning. However, the necessary degree of abstraction has to be maintained.

3.2.2.2 OA Experts. The OA experts are available to the *JOPG* during the entire planning process. During the preparations, most of their work focuses on the *COA* segments to be analyzed. Using simulation programs (cf. Annex E), they develop trends and tendencies in close cooperation with the liaison officers and *JOPG* planners. During the wargame, they will then support the in the cognition phase with the previously developed results.

3.2.3 **Blue Cell.** The Blue Cell will present the friendly *COA* segments that are to be analyzed.

3.2.3.1 Blue Cell Spokesman. During the preparations, the Blue Cell spokesperson is responsible for the processing of the *COA* segments to be analyzed. During the execution of the wargaming, he will present the segments. In the cognition phase, he will ensure that information which is relevant for the Blue Cell but is not entered into the synchronization matrix will be recorded.

3.2.3.2 Blue Cell Secretary. As directed by the spokesperson, the Blue Cell secretary will record relevant results.

3.2.3.3 Other *JOPG* Elements. In Stage III *"Concept Development"*, this personnel will develop the *COA* to be analyzed. During the preparation, they will process the *COA* segments to be analyzed. In the execution, they will provide the Blue Cell spokesperson with detailed information, but they will not give a lecture.

3.2.4 **Red Cell.** The Red Cell will present the *OPFOR COA* segments that are to be analyzed. Personnel and tasks correspond to those of Blue Cell. The major task of the Red Cell is to act as a demanding opponent. The freedom of action is limited by the possibilities of the respective *OPFOR COA*. The more demanding the Red Cell acts, the more information can be collected on friendly *COA*.

3.2.5 **White Cell.** A White Cell is necessary only if an additional, independently acting party is involved whose behavior can influence the operational planning and which cannot be described by the executive or the Blue/Red Cell due to its special significance for the operation. Such a party could be political, ethnic, military groups or humanitarian-aid institutions. Usually, the personnel strength of the White Cell is rather low and consists of the spokesperson, a secretary, and experts, if needed.

3.3 **PREMISES AND PRESENTATION MEDIA.** The room in which the wargaming will take place needs to be prepared so that all participants can overlook the situation display and recorded information. The Blue and Red Cells are seated opposite of each other in order to underline the confrontational character. The direction is situated between the cells to keep a general overview (see Annex C). Presentation media are those being used to present the development of the situation - including the initial situation - and the recording of information. The situation display has to be clearly arranged and large enough so that all participants can watch properly. A stringent and extensive recording of information is crucial for wargaming to be valuable as an analysis procedure. Information is recorded in the form of a digital synchronization matrix. This matrix has to be thoroughly prepared by entering the measures taken by Blue and Red in the segments to be analyzed even before the execution of the wargame (see Annex D).

3.4 **PROCESSING OF COA AND OPFOR COA.** In accordance with the determined method and the segments to be analyzed (for the subdivision of the segments, see Chapter 2.2), the Blue and Red Cells will then prepare the documents and contents necessary for the execution. The *COA* and *OPFOR COA* segments to be analyzed have to be processed according to time, space, and measures. This includes in particular:

3.4.1 General Overview over *COA* and *OPFOR COA*. The visualization of *COA* and *OPFOR COA* from the *COA Update Briefing*

has to be used during the execution of wargaming. Figure 3-3 shows a clearly arranged form of presentation. If the *COA* are not prepared accordingly, this has to be accomplished prior to the execution of wargaming.

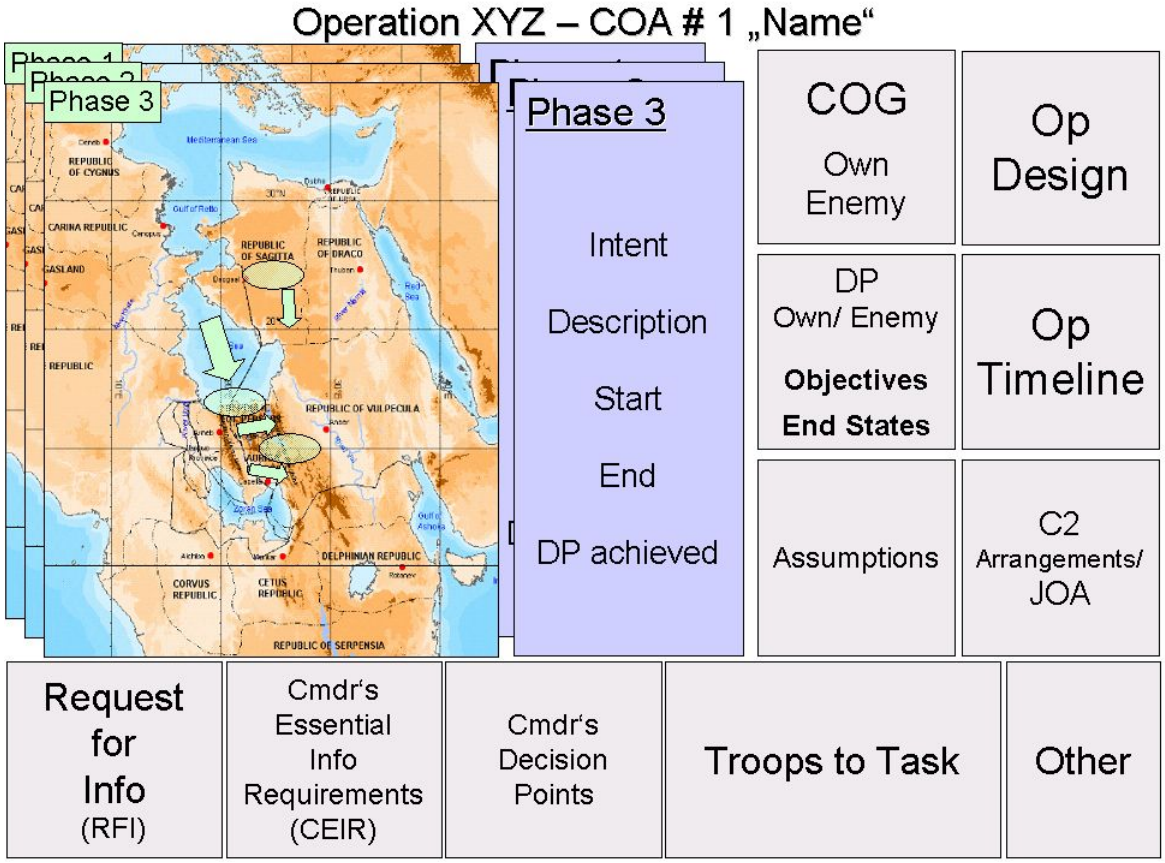

Figure 3-3: Example structure of a general overview over *COA*

3.4.2 Thread of the Segments. To execute wargaming efficiently, the segments to be analyzed have to be prepared thoroughly. The prepared threads have to be presented to the coordinator and the director for consideration in time. The executive will then use the threads for the preparation of the synchronization matrix and the situation display. The following aspects have to be developed for each segment (Figure 3-4):

- Name and time frame of the segment,
- the setting, including the deployment of forces at the beginning of the segment,
- the objective of the segment,
- all tasks by the command levels to be considered and the forces to be employed in this segment,
- *DP*s to be achieved,

- *Cmdr's Critical Information Requirements (CCIR)* and risks taken into account so far,

- desired state at the end of the segment.

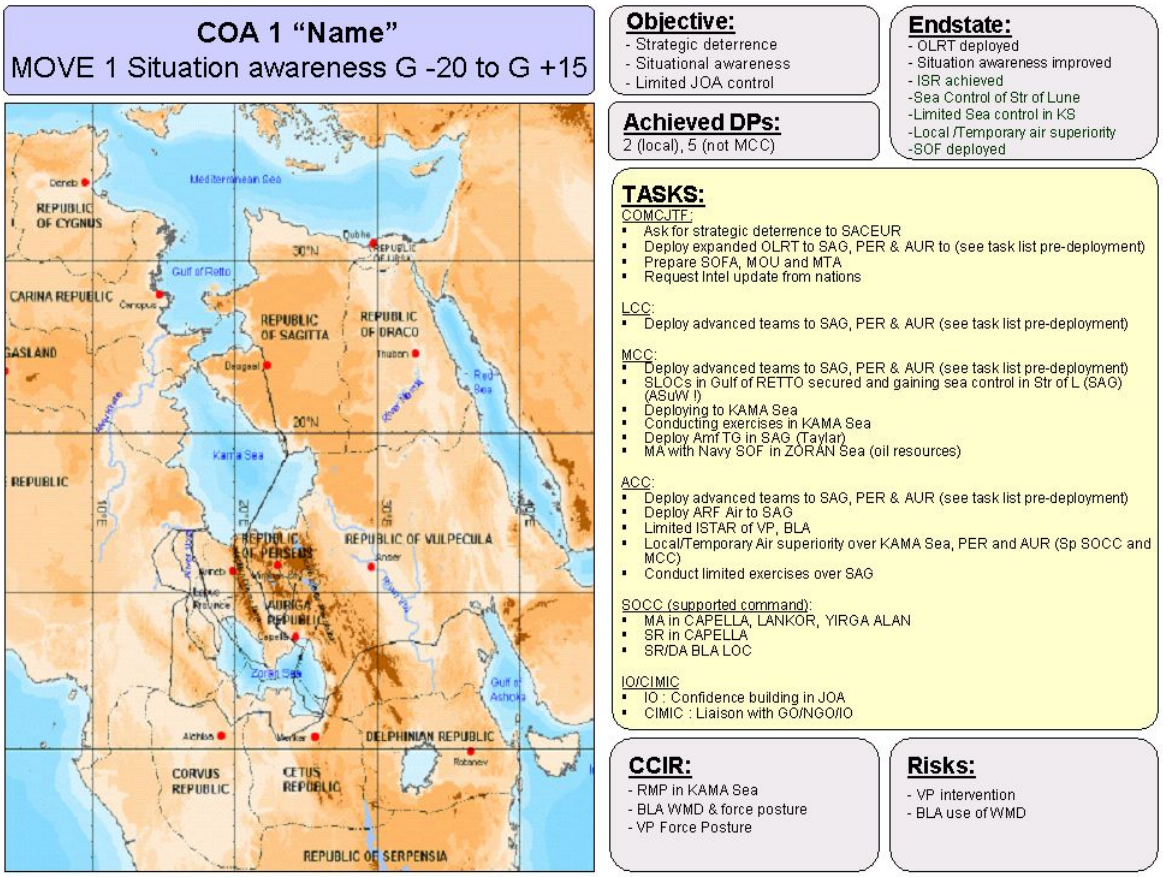

Figure 3-4: Example thread for a segment

3.4.3 The thread serves as narrative text for the cells' spokespersons during the execution. The order of the thread's contents has to be maintained in the briefing. The tasks for the command levels to be considered have to be developed and presented according to the following system: which CC is doing what using which forces where, when and for what purpose?

3.4.4 Other Documents. The simulation results have to be kept ready for each segment. They do not serve as a narrative text but for quick responses to questions related to understanding.

3.5 **OPERATIONAL ANALYSIS DURING PREPARATION.** The planned conduct of operations (thread) provides the basis for the analyses of OA during the preparation, directly before the wargaming. It has been built up during *Concept Development* by the cooperation of *JOPG*, CC, and OA. During *COA development*, OA was used to clarify specific issues, such as how many aircraft of which type are needed to gain air superiority in area X by D + 4,

while now the interaction is considered as a whole. This primarily serves the purpose of:

- Checking the availability of forces according to time and space,
- revising the assumed time allowances for mission accomplishment,
- revising the planned force potential for missions to be accomplished with regard to strength and capabilities,
- identifying indicators such as rates of wear or necessary concentration of forces,
- considering the required amount of synchronization of portions of the operations.

For the development of prognoses, it is necessary to simulate as many variations as possible to remain capable of making a statement on deviations from the presumed conduct of operations during the execution of wargaming. During the wargaming, the prognoses gained in these analyses are used to make a *COA* quantifiable in terms of time, number of forces and scope of capabilities. Thus, advantages and disadvantages can be shown more distinctly. Annex E contains an example illustration of analysis capabilities.

4 EXECUTION OF WARGAMING.

4.1 **STRUCTURE OF EXECUTION.** The execution of wargaming starts with the introduction to the theatre situation. The ensuing sequences comprise the presentation of the respective *COA* and *OPFOR COA* to be analyzed, the cycles and the final assessment. A cycle starts with the presentation of the initial situation, followed by the movement divided into “Action“, “Reaction“, and “Counteraction“, and the subsequent cognition phase (Figure 4-1).

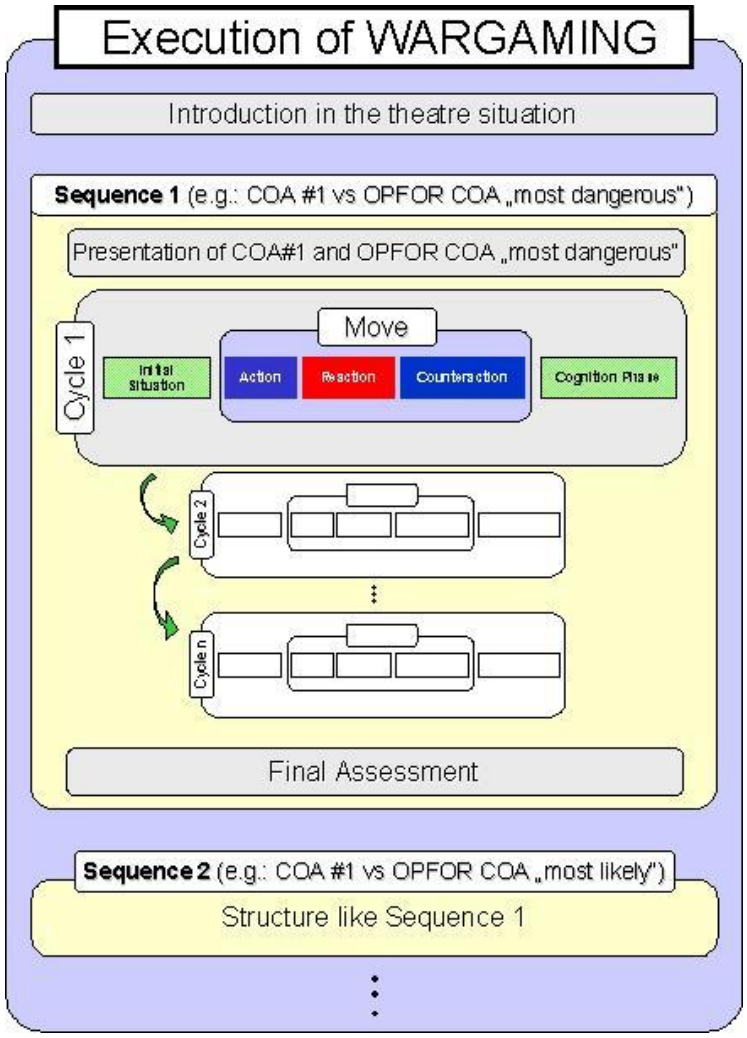

Figure 4-1: Structure of Execution

4.1.1 The number of sequences results from the combination of all *COA* and *OPFOR COA* to be analyzed. In case of two *COA* and two *OPFOR COA*, for example, four sequences will have to be examined. Out of the *OPFOR COA*, the most dangerous and most likely *COA* have to be looked at as a minimum.

4.1.2 In a sequence, all defined segments of a *COA / OPFOR COA* combination will be analyzed. In each cycle, a defined segment is examined. When all sequences have been run through, the execution of wargaming is over.

4.2 **INTRODUCTION TO THE THEATRE SITUATION.** Prior to the beginning of the first sequence, the director will give one short briefing on the basic situation:

- Coordination measures (which *COA/OPFOR COA* combination, etc.),
- *Mission Statement* (purpose, type and time of operation, JOA, *Desired End State* of operation),
- *Cmdr's Planning Guidance (CPG)* and, linked with that, *Constraints and Restraints*,
- *Center of Gravity (COG)*,
- *Cmdr's Selection Criteria.*
- Information about the functional areas of the direction personnel and coordination measures as well as the overall time frame and time allowances for the cells' presentations can be repeated, if necessary.

4.3 **INTRODUCTION OF *COA* AND *OPFOR COA*.** At the beginning of each sequence, *COA* and *OPFOR COA* are briefly introduced (maximum 3 minutes each) by the cells' spokesman, using the general overview. Thus all participants have the same state of knowledge and are informed about the basic ideas of the concept of operations.

4.4 **STRUCTURE OF THE CYCLES.** The cycles follow a defined system (Figure 4-2).

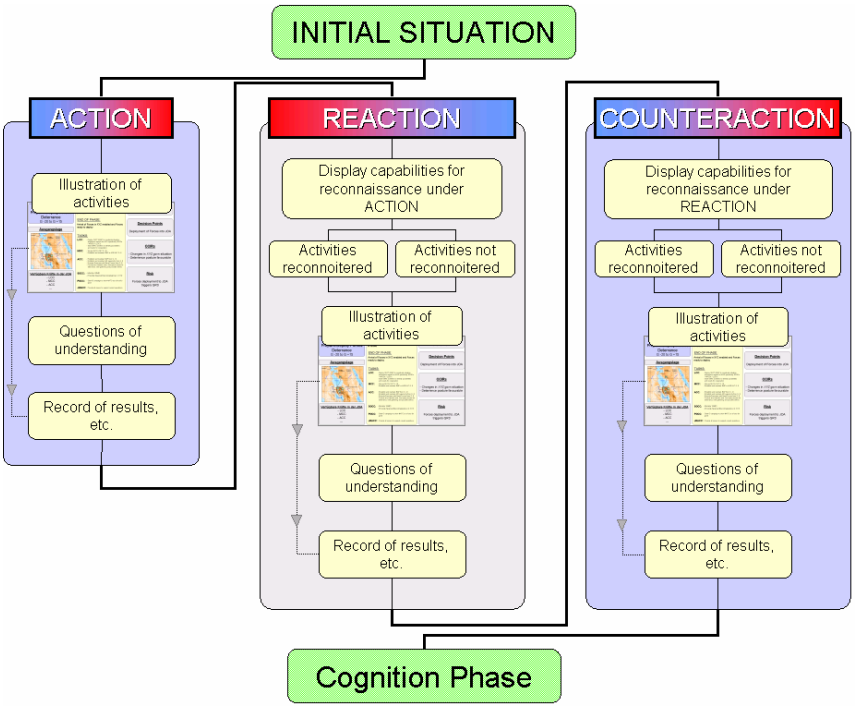

Figure 4-2: Structure of the cycles

4.4.1 First of all, the director will ensure that an introduction to the **setting** of the cycle is provided. He will have the situation in the *JOA* - regarding the segment which is subject of analysis - presented on the basic of the force allocation of Red and Blue (White, if applicable), their deployment and strength. The coordinator is responsible for visualizing this initial situation with the selected presentation media. Then the director will decide who shall have the initiative and start with the movement. For this decision, it has to be taken into account that the initiative does not necessarily have to be given to Blue. At the beginning of an operation, Red usually has the initiative as Red is required to act at that time. For the analysis of later segments, the director has to determine who will gain the initiative.

4.4.2 The move begins with the element **"Action"**. The spokesman of the party having the initiative (Party A) will introduce the segment of his *COA*, using the prepared thread. This includes, among other things, the objective to be achieved and the presentation of friendly measures in the required degree of detail. All available forces and capabilities, assigned tasks as well as the description of their planned combat activities, deployments, or movements have to be considered. The coordinator ensures that the given time for speaking and the degree of detail will be observed. If necessary, he will have open questions related to understanding clarified. In case of controversial issues, the director will call upon the arbitrator to bring about a decision. The cells' secretary and the direction make parallel records of results and first ideas for the cognition phase, information and conclusions.

4.4.3 The move continues with the element **“Reaction”**. The spokesman of the opposing party (Party B) will introduce the corresponding segment of his *COA*, also with the help of the thread. The presented measures do not have to be a reaction to the “Action” measures in the literal sense of the word. “Reaction” includes all measures, even those taken independently of the previous “Action”. Being an integral part of this element, the intelligence collection and reconnaissance measures have to be given special consideration. It is most important to determine which of the activities carried out by Party A in the “Action” can be reconnoitered. If it is not possible to reconnoiter activities of Party A, the corresponding *COA* segment has to be executed without information about the opponent’s activities. If it is possible to gain information about the activities of Party A, flexible responses can be carried out within the framework of the thread. The director ensures that the contents of the *COA* are observed. The coordinator ensures that the given time for speaking and the degree of detail will be observed. If necessary, he will have open questions related to understanding clarified. In case of controversial issues, the director will call upon the arbitrator to bring about a decision. The cells’ secretary and the direction make parallel records of results and first ideas for the cognition phase, information and conclusions.

4.4.4 The move ends with the element **“Counteraction”**. “Counteraction” is the most flexible element of the move. The spokesman of Party A will now address the previous events in “Action” and “Reaction” within the framework of the options of his thread. For that, intelligence collection and reconnaissance capabilities have to be taken into account in order to determine which activities of the “Reaction” can be reconnoitered. This results in options for Party A as responses to the opponent’s “Reaction”. The tasks of the director, coordinator, secretaries and arbitrator are the same as for the previous elements.

4.4.5 The goal of the **cognition phase** is to record the information identified by the director and the resulting conclusions in the synchronization matrix.

4.4.6 The results recorded during the elements of the move will be assessed by all participants of the wargame under the responsibility of the director. For the assessment of the results, the director gets advised by OA experts, liaison officers and the spokespersons of the Blue and Red Cells. The director determines the information and conclusions. In accordance with the director’s instructions, the collected information and the resulting conclusions are transferred to the synchronization matrix (Figure 4-3). That will end the cycle.

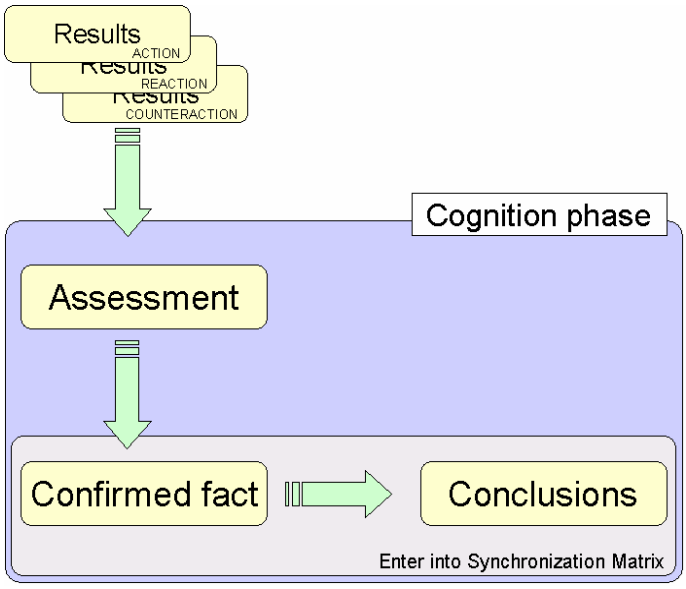

Figure 4-3: From Results to Conclusions

4.4.7 Depending on the wargaming method used, the **next cycle** can chronologically tie in with the previous one or represent the beginning of a spatially and chronologically staggered segment. If the cycle just finished has an effect on the following cycle, there are two possible ways to continue. This effect should either be recorded in the synchronization matrix (e.g. conclusion: earlier time of deployment, larger number of forces), or the setting has to be adapted according to the result. It is recommended that only an experienced staff proceed like this.

4.4.8 If all *COA* segments have been analyzed in the cycles, the director has to sum up all cognition phase in order to make a final assessment of the *COA* examined in this sequence. The *Cmdr's Selection Criteria* are the yardstick for this assessment. All collected findings have to be compared with them. From this, the advantages and disadvantages of the *COA* in the sequence are determined. This includes qualitative statements such as quickly gaining the initiative, great element of surprise, or a high risk at the beginning of the operation. That has to happen at that very time as the collected findings and conclusion form the basis for the subsequent evaluation. The sequence ends with this final assessment.

5 **Evaluation.** This part of the guide describes how the findings resulting from the sequences can be assessed. On the basis of this assessment, the *COA* can be compared with each other so that a *COA* can be suggested for resolution in the subsequent *Decision Briefing*. The evaluation is generally to be done by the director, coordinator, spokespersons of Blue and Red Cells as well as OA experts. They should make use of: the *Cmdr´s Selection Criteria* as a yardstick for the evaluation, and the findings determined during the wargame.

5.1 **ASSESSMENT OF THE INDIVIDUAL COA.** The assessment of the individual *COAs* is done basing on the summary of findings from the sequences in which a certain *COA* was compared with the *OPFOR COA*. The different *COA* can be compared only after the advantages and disadvantages of all *COA* have been determined (Figure 5-1).

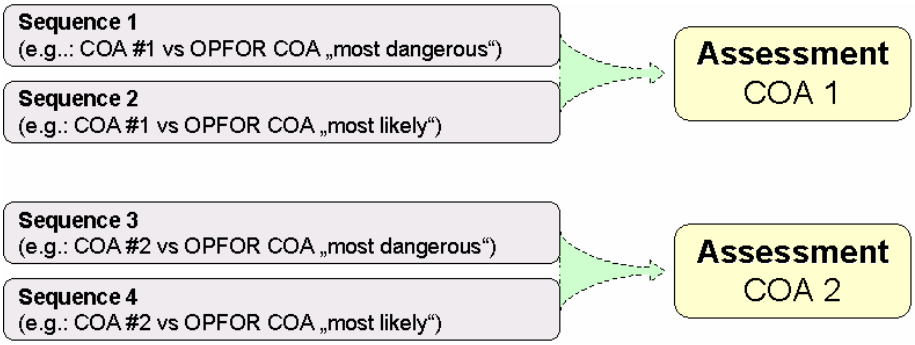

Figure 5-1: Assessment of the individual *COA* from the sequences

5.1.1 The following documents are available from the sequences for the assessment:

- A list of the advantages and disadvantages (from the final assessment of each sequence),
- the synchronization matrix,
- situation maps showing the segments considered in the wargame,
- the *COA* in the form of the corresponding general overview.

5.2 **COMPARISON OF *COA*.** Comparison of *COA* means weighing them up in order to determine the most promising *COA*. The advantages and disadvantages of the *COA* are the starting point for the comparison. For the comparison, different procedures can be applied. In the following, four procedures will be introduced: the Advantage/Disadvantage Matrix and the Strengths-Weaknesses-Opportunities-Threats-Matrix (SWOT matrix) as procedures for qualitative comparison, and the Color-Coded Decision Matrix as well as the Weighted Decision Matrix as procedures for quantitative comparison.

5.2.1 Advantage/Disadvantage Matrix. The advantages and disadvantages of the individual *COAs* determined in the assessment always represent a qualitative evaluation already. Therefore, the Advantage/Disadvantage Matrix is the easiest and fastest procedure for comparing the individual *COA* (Figure 5-2). The advantages and disadvantages of the *COA* are listed in a table so that they can be compared with each other.

COA #1		COA #2	
Advantage	Disadvantage	Advantage	Disadvantage
1. 2. 3. 4. 5. ⋮ n.	1. 2. 3. 4. 5. ⋮ n.	1. 2. 3. 4. 5. ⋮ n.	1. 2. 3. 4. 5. ⋮ n.

Figure 5-2: Advantage/Disadvantage Matrix

5.2.2 To determine the most promising *COA*, the pure number of the listed advantages and disadvantages is not the decisive factor. The advantages and disadvantages have to be weighed up. In doing this, it has to be found out which *COA* holds a decisive advantage or disadvantage. The decisive factor is the importance of the *Cmdr's Selection Criteria*.

5.2.3 The advantage of this procedure is that it is quick and easy to apply. However, it becomes confusing if more than two *COA* are compared. In addition, the presentation of pure advantages and disadvantages requires a more comprehensive explanation in the *Decision Briefing*.

5.2.4 SWOT Matrix. The SWOT Matrix (Figure 5-3) is an advanced procedure for qualitative development. Strengths and opportunities as well as weaknesses and threats are deduced from the advantages and disadvantages of the *COA*, listed in a table and then compared.

COA #1		COA #2	
Strengths	Weaknesses	Strengths	Weaknesses
1. 2. 3. ⋮ n.	1. 2. 3. ⋮ n.	1. 2. 3. ⋮ n.	1. 2. 3. ⋮ n.
Opportunities	Threats	Opportunities	Threats
1. 2. 3. ⋮ n.	1. 2. 3. ⋮ n.	1. 2. 3. ⋮ n.	1. 2. 3. ⋮ n.

Figure 5-3: SWOT Matrix

5.2.4.1 The pure number of the listed strengths, opportunities, weaknesses and risks is no selection criterion for the determination of the most promising *COA*. Rather, it has to be found out, which *COA* holds the most promising option due to its strengths and opportunities - accepting the weaknesses and threats linked with that. On this basis, a *COA* can be selected as a decision proposal.

5.2.4.2 The advantage of this procedure is that a very clear relation to the *Cmdr's Decision Criteria* is established by means of the strengths, opportunities, weaknesses and threats. Its weak point is the confusing visualization when comparing more than two *COA*, because a lot of conclusions have to be illustrated. Furthermore, the large number of conclusions also requires a more detailed explanation in the *Decision Briefing*.

5.2.5 Quantitative Comparison – Color-Coded Decision Matrix. To supplement qualitative comparisons, the *COA* can also be compared in terms of quantity. One possible option for that is the Color-Coded Decision Matrix (Figure 5-4), which is the most clearly arranged procedure. Here, the *COA* are compared by arranging the *Cmdr´s Selection Criteria* according to their significance and assigning each *COA* a level of significance regarding the fulfillment of each criterion. Four levels are possible.

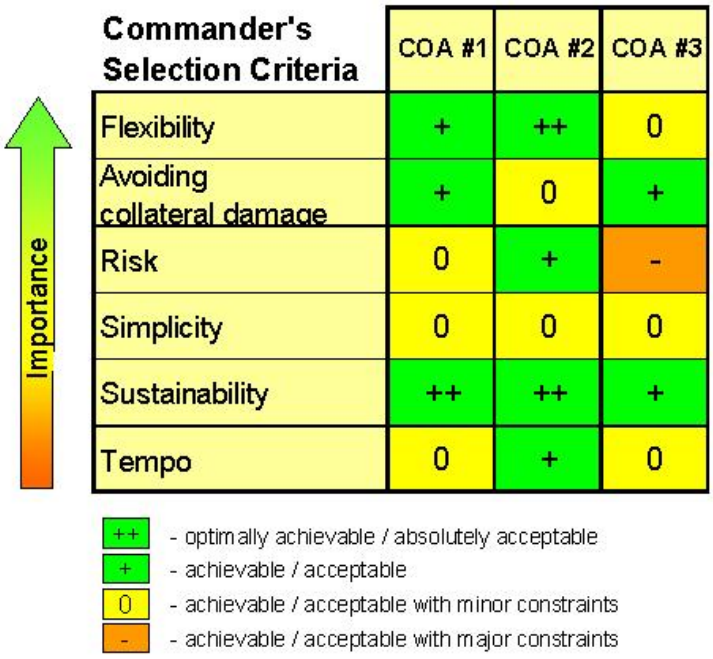

Figure 5-4: Color-Coded Decision Matrix

To determine the most promising *COA*, the *COA* that best fulfills the most important criteria is to be selected. The advantage of this procedure is the clarity due to which even several *COA* can be compared at a glance. A disadvantage is that both the order of the *Cmdr´s Selection Criteria* and the degree of compliance with the criteria are subjective. Moreover, the determined advantages and disadvantages of the *COA* are not visualized.

5.2.6 Quantitative Comparison – Weighted Decision Matrix. The Weighted Decision Matrix (Figure 5-5) is another procedure for quantitative comparison. Here, the *COA* are compared by assigning a numerical value to their prospect of success. At first, the *Cmdr´s Selection Criteria* are weighted according to their significance ranging from 1 (low) to 5 (high). Then the degree of compliance for each criterion of each *COA* is assessed ranging from 1 (low) to 5 (high). For each of the *Cmdr's Selection Criteria* a numerical value is calculated by multiplying the significance level with the degree of compliance. To determine the *COA's* prospect of success, these values need to be added. The most promising *COA* will have the highest value.

Commander's Selection Criteria	Factor	COA #1		COA #2		COA #3	
		individual score	Total	individual score	Total	individual score	Total
Avoiding collateral damage	3	3	9	2	6	3	9
Risk	3	2	6	3	9	3	9
Tempo	1	2	2	3	3	2	2
Flexibility	4	3	12	4	16	2	8
Simplicity	2	2	4	2	4	1	2
Sustainability	2	4	8	4	8	3	6
			41		46		36

Figure 5-5: Weighted Decision Matrix

5.2.6.1 An advantage of this procedure is that several *COA* can be compared in one chart. Furthermore, the numerical values, which do not leave scope for interpretation, can be used to rank the *COA*.

5.2.6.2 A disadvantage is the fact that the overall assessment is reduced to a numerical value. This suggests objectivity, however, both the weighting of the criteria and the degree of compliance are actually subjective. Thus, the seemingly objective procedure is twice as subjective. To use this procedure, definite reasons have to justify the fact that some *Cmdr's Selection Criteria* have many times more importance than others, and there have to be comprehensible reasons for the assignment of the degree of compliance.

By means of qualitative comparison of *COA*, and quantitative, if needed, the *JOPG* is able to identify a *COA* and, giving an explanation, to suggest it in the *Decision Briefing*.

In addition, the results from the wargaming are necessary in order to improve the *Provisional Statement of Requirements (SOR).* These revised *Provisional SOR* are used to continue the *OPP* in Stage IV *"Plan Development"*.

6 APPENDIX

6.1 **BIBLIOGRAPHY**

Belknap, Maggie	The Force-on-Force Model, An Anachronism in the Information Age in JFQ, Washington, 1997
Blennemann, Ulrich M.A., Gesellschaft für historische Simulationen e.V. (GHS**)**	Abhandlung “Die Geschichte des CoSims“ www.g-h-s.org/cosimtext.htm without indication of place and date of publication
Bundesministerium der Verteidigung, Führungsstab Marine	Leitfaden zur Anwendung des „Operational Planning Process“ in der Marine, Bonn 2004
Dunnigan, James F.	The complete Wargamers Handbook, New York, 1992
Emmett, Peter C.	Software Warfare, The Militarization of Logic in JFQ, Washington, 1994
Führungsakademie der Bundeswehr Fachbereich Führungslehre Heer	Leitfaden für das Planspiel auf der Ebene de taktischen Führung, Hamburg, without indication of date of publication
Haffa, Robert P. (JR), Patton, James H. (JR)	Gaming the “System of Systems” in Parameters, Carlisle (PA), 1998
Haffa, Robert P. (JR), Patton, James H. (JR)	Wargames: Winning and Losing in Parameters, Carlisle (PA), 2001
Hausrath, Alfred H.	Venture Simulation in War, Business and Politics, New York, 1971
Heeresamt	HDv 101/ 200 Übungen, Köln, 2002
Headquarters Allied Command Europe Rapid Reaction Corps	TACSOI I1012, Plans Handbook, Mönchengladbach, 2001
Joint Chiefs of Staff, US Armed Forces	Joint Task Force Planning Guidance and Procedures, Joint Pub 5-00.2, Washington, 1999
Joint Chiefs of Staff, US Armed	Plans and Policy (J5) Handbook,

Forces	Washington, without indication of date of publication
Landesverteidigungsakademie (Österreichisches Bundesheer)	Wargame, Vienna, 2004
LaPlante, John B., u.a.	Logistics in Wargaming, An Initial Report, in JFQ, Washington, 1996
Ministry of Defence Great Britain	Land Component Handbook (Doctrinal Notes), London, 2001
NATO C3 Agency	GAMMA 2.2 Global Aggregated Model for Military Assessment, The Hague, 2005
Perla, Peter P.	The Art of Wargaming, Annapolis, 1990
Perla, Peter P.	Future Directions for Wargaming in JFQ, Washington, 1994
Smith, Edward A.	The Navy RHA War Game Series, without indication of place of publication, 1996
Supreme Headquarters Allied Powers Europe	Allied Command Operations, Guidelines of Operational Planning, Mons, 2004
US Army	Field Manual 34 – 130, Appendix A, Intelligence Preparation of the Battlefield, Wargaming and Intelligence Synchronisation, without indication of place and date of publication
US Army Command and General Staff College	Command and Staff Decision Process, Fort Leavenworth, Kansas, 1995
US Army Command and General Staff College	The Tactical Decision making Process, Fort Leavenworth, Kansas, 1993
US Naval War College	Commanders Estimate of the Situation, NWC 4111G, New Port, 2004
Warfare Studies Instiute (USA)	Joint Air Estimate Planning Handbook, Maxwell, 2003

6.2 **LIST OF ABBREVIATIONS AND ACRONYMS**

ACC	Air Component Command
ATF	Alliance Task Force
C2	Command and Control
CC	Component Command
CCIR	Commander's Critical Information Requirements
Cmdr	Commander
CEIR	Commander's Essential Information Requirements
CIMIC	Civil-Military-Co-operation
COA	Course of Action
COG	Centre of Gravity
CONOPS	Concept of Operations
CPG	Commander's Planning Guidance
CRO	Crisis Response Operation
DIME	Diplomatic, Information, Military, Economy
DP	Decisive Point
GOP	Guidelines for Operational Planning
InfoOps	Information Operations
IR	Information Requirement
ISR	Information Surveillance Reconnaissance
JFC	Joint Force Command(er)
JOA	Joint Operations Area
JOPG	Joint Operational Planning Group
JTTL	Joint Troops to Task List
LCC	Land Component Command
LNO	Liaison Officer
LOO	Lines of Operation
MCC	Maritime Component Command
NAI	Named Area of Interest
NC3A	NATO Consultation, Command and Control Agency
NG&A	Nachrichtengewinnung und Aufklärung
NGO	Non Governmental Organization
OA	Operational Analysis
OPFOR	Opposing Force
OPLAN	Operation Plan
OPP	Operational Planning Process
PMESII	Political Military Economic Social Information Infrastructure
POTF	Psychological Operations Task Force
PSYOPS	Psychological Operations
RFI	Request for Information
ROE	Rules of Engagement
SOF	Special Operations Forces
SOR	Statement of Requirement
SOTF	Special Operations Task Force
SWOT	Strengths Weaknesses Opportunities Threats
TFC	Task Force Commander
TTL	Troops to Task List

6.3 LIST OF FIGURES

FIGURE NO		PAGE
Figure 1-1	The OPP stages and areas of application of wargaming	2
Figure 1-2	Structure of Wargaming	4
Figure 2-1	*Wargame Phases*	7
Figure 2-2	*Wargame Segments of the Battle Space*	8
Figure 2-3	*Wargame Decisive Points*	8
Figure 3-1	Preparation and its Results	11
Figure 3-2	Participants	12
Figure 3-3	Example structure of a general overview over *COA*	15
Figure 3-4	Example thread for a segment	16
Figure 4-1	Structure of Execution	18
Figure 4-2	Structure of the cycles	20
Figure 4-3	From results to conclusions	22
Figure 5-1	Assessment of the individual COA from the sequences	23
Figure 5-2	Advantage/Disadvantage Matrix	24
Figure 5-3	SWOT Matrix	25
Figure 5-4	Color-Coded Decision Matrix	26
Figure 5-5	Weighted Decision Matrix	27

OPERATIONAL PLANNING PROCESS IN ACCORDANCE WITH GOP

1 The Operational Planning Process consists of 5 Stages (Figure A-1).

Figure A-1: *OPP Stages*

2 **STAGE 1: "INITIATION"**. In the first stage, the responsible operational level is given the order to start the planning for achieving a strategic objective at the operational level. At that time, the responsible level within the staff, usually a designated Joint Force Command (JFC), will form the Joint Operational Planning Group (Figures A-2 and A-3). The group is intended to ensure thorough planning in parallel with the ongoing operations. The JOPG is usually led by the J5. Besides the planners ordered from the J5 Division, staff officers of other staff divisions will join the JOPG to ensure the necessary expertise for planning. In addition to that, the OA experts and the subordinate areas - mostly LCC, ACC, MCC that have assigned liaison elements - are integrated into the planning at a very early stage.

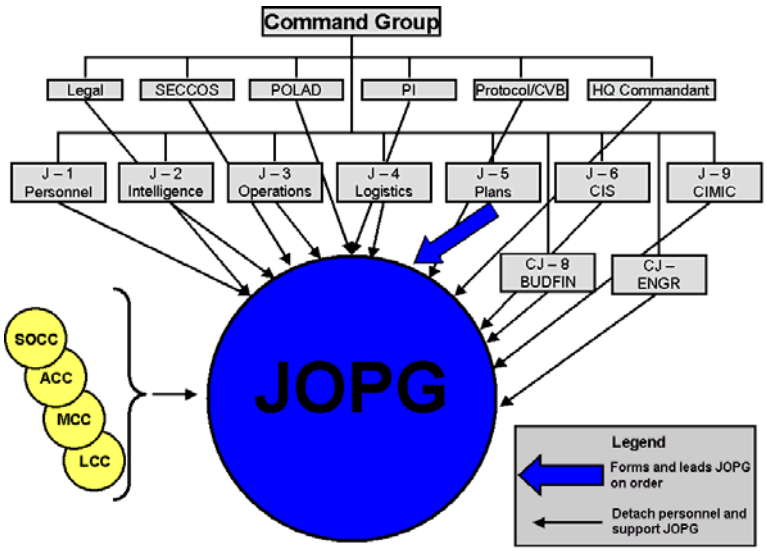

Figure A-2: Forming of JOPG

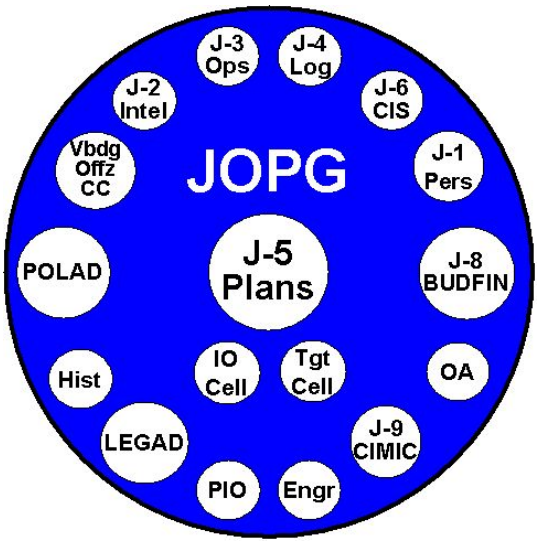

Figure A-3: JOPG Members

3 **STAGE 2: "ORIENTATION"**. In this second stage, the objectives that need to be achieved in order to accomplish the given order are determined. The results of this stage include:

3.1 The "Mission Statement":

3.1.1 Who will conduct the operation,

3.1.2 what has to be done,

3.1.3 when will the operation be conducted,

3.1.4 where will the operation take place,

3.1.5 what is the purpose of this operation?

3.2 The "Operational Design":

3.2.1 End-States, Objectives,

3.2.2 Centers of Gravity,

3.2.3 Decisive Points,

3.2.4 Criteria for Success,

3.3 Cmdr's Planning Guidance with the key elements:

3.3.1 Desired End State,

3.3.2 Criteria for Success,

3.3.3 Mission Statement,

3.3.4 Cmdr's Initial Intent.

This sets the further objective of planning.

4 **STAGE 3: "*CONCEPT DEVELOPMENT*"**. In the third stage, concrete *COA* for achieving the objectives can be developed on the basis of the above requirements. First, these courses of action are developed taking into account the *Cmdr's Selection Criteria* and examined for their feasibility. Then, the details are drawn up. In the subsequent analysis, it is reviewed whether the *COA* meet the requirements of the *Cmdr's Planning Guidance*. Especially wargaming serves this purpose. With the comparison of the friendly *COA* and the *OPFOR COA* (which will be developed in the *JOPG* in parallel), the capabilities of the friendly *COA* can be compared later. The *Concept Development* phase concludes with the decision for a *COA* made by the commander in the *Decision Briefing*. This provides the basis for:

4.1 The *Concept of Military Operations* (Mission Statement, Employment of Principal Forces, Intent, Tasks for HQ and Subordinate Cmdr, etc.),

4.2 A *Provisional Statement of Requirements* (Forces Required, Task Organization, Timeline when and where each force element must be operationally ready).

5 **STAGE 4: "*PLAN DEVELOPMENT*"**. In the fourth stage, the actual *OPLAN* is developed on the basis of the *Concept of Operations (CONOPS)* and *SOR*. The actual forces to carry out the mission are determined. The processes of Force Generation and Force Identification serve this purpose. Moreover, the following activities are carried out during this phase:

5.1 *Manpower Planning*: manning of headquarters (In-place HQ or expeditionary HQ including CJTF).

5.2 *Sustainment Planning*: detailed planning of sustainability and logistic concepts.

5.3 *Force Protection Planning*: detailed planning of Protective Security, Active Defence, Passive Defence, Recuperation basing on the information gained so far.

5.4 *Deployment Planning*: coordination of national and multinational deployment plans.

6 **STAGE 5: "*PLAN REVIEW*"**. In the fifth stage, it is reviewed whether the development of the *OPLAN* has led to changes to the initial planning that require a revision. Wargaming holds a central position in the entire planning process as it is the means to analyze the developed friendly *COA* by comparing them with the opponent's actions and thus allowing a comparative consideration and selection of the most suitable *COA*. Figure A-4 shows a summary of the *OPP* and its results.

OPP Stage	Input	Steps	Output
I: Initiation	Mission received from higher Headquarters or deduced by commander and staff	**Step 1:** Receipt of Mission	• Cmdr's initial Guidance • WARNING ORDER
II: Orientation	• Higher HQ's order plan • Higher HQ's IPB • Staff estimates	**Step 2:** Mission Analysis	• Restated Mission Statement • Initial Cmdr's Intent and Planning Guidance • OP Design • Initial CCIR • Updated Staff Estimates • Initial IPB Products • Initial ISR Plan • Preliminary movements
III: Concept Development	• Restated Mission • Initial CPG and CCIR • Updated Staff Estimates • Initial IPB Products	**Step 3:** COA Development	• Updated Staff Estimates and products • COA statements and sketches • Refined Cmdr's intent and Planning Guidance
	• Refined Cmdr's intent and Planning Guidance • OPFOR COA • COA statements and sketches	**Step 4:** COA Analysis (Wargame)	• Wargame Results • Decision support templates • Task Organization • Mission to subordinate units • Recommended CCIR
	• Wargame results • Criteria for comparison	**Step 5:** COA Comparison	• Decision Matrix
	• Decision Matix	**Step 6:** COA Approval	• Approved COA • Refined Cmdr's intent • Refined CCIR • High pay-off target list
IV: Plan Development	• Approved COA • Refined Cmdr's intent • Refined CCIR	**Step 7:** Order Production	• OPLAN/ OPORD
V: Plan Review	• OPLAN • Situation update	**Step 8:** Revision	• If necessary refined OPLAN

Figure A-4: Order of OPP

TASK DESCRIPTIONS

Function:	**EXECUTIVE PERSONNEL** Here: Director
General:	+ usually Director *JOPG* + Deputy Director *JOPG,* if applicable + Overall Director + responsible for overall framework conditions
Preparation:	+ checks threads for correspondence with *COA*
Execution:	+ introduces basic situation at the beginning of the execution + presents setting in every cycle + determines initiative + accompanies movements in terms of contents + chairs discussion + has information recorded + decides when to employ the arbitrator
Evaluation:	+ chairs evaluation as preparation of *COA Decision Briefing*

Function:	**EXECUTIVE PERSONNEL** Here: Coordinator
General:	+ to be appointed by Director *JOPG* when forming *JOPG* + should have greatest experience in the application of wargaming + is responsible for all organizational measures connected with Wargaming + ensures stringent preparation, execution, and evaluation
Preparation:	+ is responsible for assignment of personnel + holds Instruction Briefing + supervises preparatory measures + checks threads
Execution:	+ ensures adherence to the rules + does not allow comparisons of *COA* + prevents assessments during the cycles + coordinates the employment of duty personnel
Evaluation:	+ supports evaluation as preparation of the *COA Decision Briefing*

Function:	**EXECUTIVE PERSONNEL** Here: Umpire
General:	+ usually, an experienced staff officer with corresponding reputation + possibly an external staff officer
Preparation:	+ familiarizes himself with the different *COA*
Execution:	+ is an all-party institution + is asked for a decision by the director + supports the director in stringently achieving the goal of the wargame
Evaluation:	

Function:	**EXECUTIVE PERSONNEL** Here: Secretary
General:	+ is responsible for recording the minutes + is responsible for keeping the records of the synchronization matrix
Preparation:	+ has to be informed about objective and organization in detail + prepares the synchronization matrix on the basis of the threads
Execution:	+ acts on order of the director + takes results down + makes entries into synchronization matrix on order of the director
Evaluation:	+ supports the evaluation as a preparation for the *COA Decision Briefing*

Function:	**EXECUTIVE PERSONNEL** Here: Duty Personnel
General:	+ support direction / *JOPG* in preparation and execution + tasks beyond documentation of results/taking of minutes, e.g. ▪ guide for audience ▪ situation display ▪ operation of PCs ▪ reconstruction measures
Preparation:	+ have to be informed about objective and organization in detail + prepare situation display on the basis of the threads + prepare the premises as directed by coordinator + produce overviews (as large format notice) for: ▪ *Cmdr's Selection Criteria* ▪ *Constraints/ Restraints* ▪ Basic rules of wargaming
Execution:	+ work on order of direction
Evaluation:	+ work on order of direction

Function:	**SUPPORT PERSONNEL** Here: Liaison Officers
General:	+ representatives from LCC, ACC, MCC, POCC and SOCC + liaison officers from other Task Forces and Coordination Centers as well as liaison officers of higher command authorities + maintain close liaison with their agencies in order to be able to pass on information (*Parallel Planning*) at an early stage + provide feedback on the concept of operations of the subordinate units
Preparation:	+ have to have detailed insight into the planned *COA* to be able to assess the objective and purpose („What?“) of operational planning as this is the prerequisite for the first own planning at the tactical level („How?“).
Execution:	+ bring their expertise to bear in the discussion upon request of the director
Evaluation:	

Function:	**SUPPORT PERSONNEL** Here: OA Experts
General:	+ simulate individual segments as a preparation for the Wargaming + provide their trends and tendencies for assessment of the individual segments.
Preparation:	+ simulate the *COA* segments to be analyzed + maintain close contact to the cells and liaison officers
Execution:	+ put their expertise at the director's disposal + are consulted by the director in the discussion on feasibility of the plans for the *COA* segment to be analyzed + can provide explanations on supplementary options and opportunities and keep the respective simulation results ready
Evaluation:	+ put their expertise at the director's disposal

Function:	**BLUE / RED / WHITE CELL** Here: Cell's Spokesman
General:	+ leads the cell + Blue Cell is usually led by J5.3 or J3 + Red Cell is usually led by J2
Preparation:	+ responsible for preparing the *COA* segments to be analyzed + instructs duty personnel assigned to the cell
Execution:	+ presents the segments to be analyzed + ensures documentation of results for his area
Evaluation:	+ supports the evaluation in preparation of the *COA Decision Briefing*

Function:	**BLUE / RED / WHITE CELL** Here: Other *JOPG* Elements
General:	+ *JOPG* personnel assigned to the cells
Preparation:	+ prepare *COA* segments to be analyzed for Wargaming: ▪ produce General Overview over *COA/ OPFOR COA* ▪ produce threads
Execution:	+ provide the cell's leader with detailed information, if necessary + do not hold briefings
Evaluation:	

Function:	**BLUE / RED / WHITE CELL** Here: Cell's Secretary
General:	+ support the cell in preparation and execution + are responsible for the documentation of results in the cells
Preparation:	+ have to be informed about objective and organization in detail + are responsible for providing the media for information documentation of the cells
Execution:	+ work as directed by the cell's leader + take the cells' results down
Evaluation:	

AREA ORGANIZATION AND SITUATION DISPLAY

1 **GENERAL INFORMATION**. It is essential that the simulants provide a clear arrangement. The room must not be overloaded. The following seven elements, however, have to be displayed for executing the wargame:

1.1 Situation / Situation Development

1.2 *Mission Statement*

1.3 *Constraints/ Restraints*

1.4 *Lines of Operation (LOO)*

1.5 *Cmdr's Selection Criteria*

1.6 General Overview of *COA*

1.7 Synchronization Matrix

2 **SIMULANTS**.

2.1 Situation / Situation Development. Using this presentation, the director gives an introduction to the general situation. It also serves for visualizing the development of the operation during the individual cycles. A suitable simulant would be a projector which displays the situation on a digital map, or a floor or wall map that is large enough. For all presentations, it is necessary to prepare the military symbols to be displayed.

2.2 *Mission Statement*. The *Mission Statement* represents the basis for operational planning and either has to be put up as a poster or be available as a draft document.

2.3 *Constraints/ Restraints*. see *Mission Statement*

2.4 *Lines of Operation*. The *LOO* show the sequence of events and the dependencies of the *DP* in an overall operation. To maintain a clear overview of the complex *LOO*, they have to be displayed on a chart board, meta planning wall or pinboard.

2.5 *Cmdr's Selection Criteria*. The *Cmdr's Selection Criteria* provide the guideline for the assessment of the results obtained from wargaming. Therefore, they have to be put up in large format or supplied as draft document.

2.6 General Overview of *COA* (Figure C-1). The cell's spokesperson uses the general overviews of the respective *COA* for graphic presentation and explanation of the *COA* to be analyzed. These should be presented on a chart board.

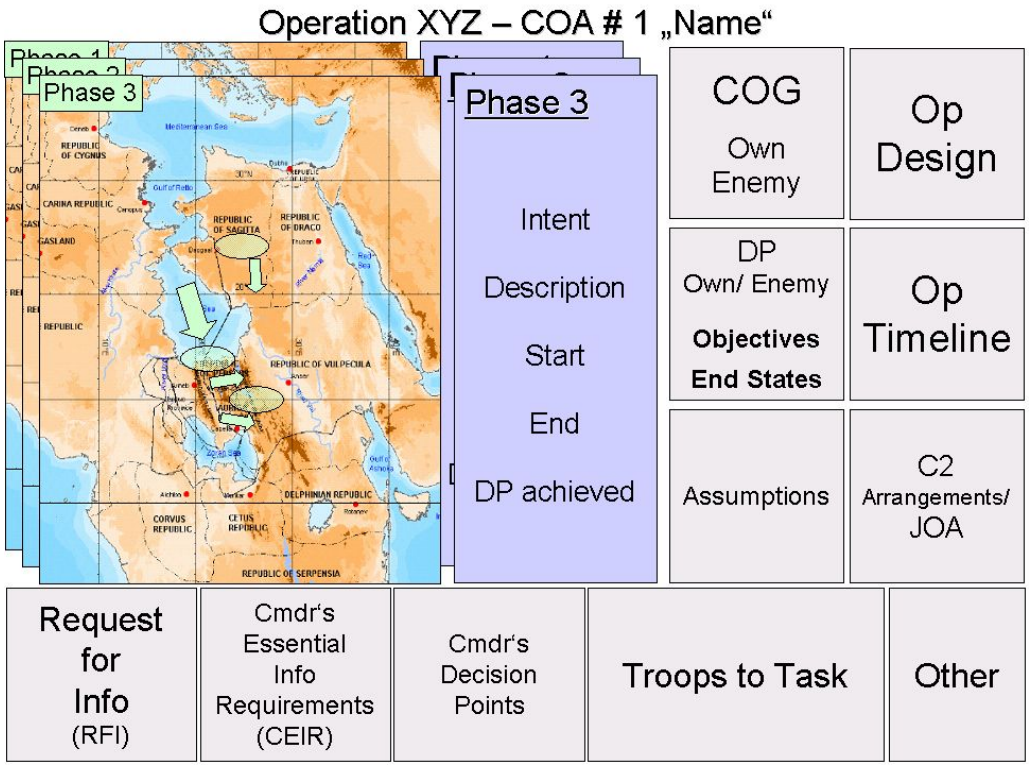

Figure C-1: General Overview of COA

2.7 Synchronization Matrix. The synchronization matrix forms the core of the wargame. It is displayed using a projector (ref. Annex D).

3 ARRANGEMENT IN THE ROOM. Direction, Blue Cell, Red Cell, and White Cell (if available) are the key figures and positioned in the center of the room. The Blue and Red Cells are placed opposite of each other in order to underline the confrontational character. Director, arbitrator, and coordinator will have their seats between the parties so that they can perform their tasks. All participants of the wargame need to have an unrestricted view of the selected media as regards the situation display, situation development and documentation of results. To keep the circle of participants directly involved manageable, representatives of the CC, command organization and other external consultants should stay in the background. However, the direction or cells should not be denied immediate access to these participants. Therefore, the tables should principally be arranged in a U shape. The choice of the simulant for the situation and situation development determines the further arrangement in the room.

3.1 If a projector instead of a map is used for situation display, a second projector is needed for the necessary digital display of the synchronization matrix.

3.2 If a wall map is to be used, only one more chart board is available due to the usually limited space capacities.

3.3 In practice, the following arrangements have proven satisfactory (figure C-2 to Figure C-4):

TWO PROJECTORS

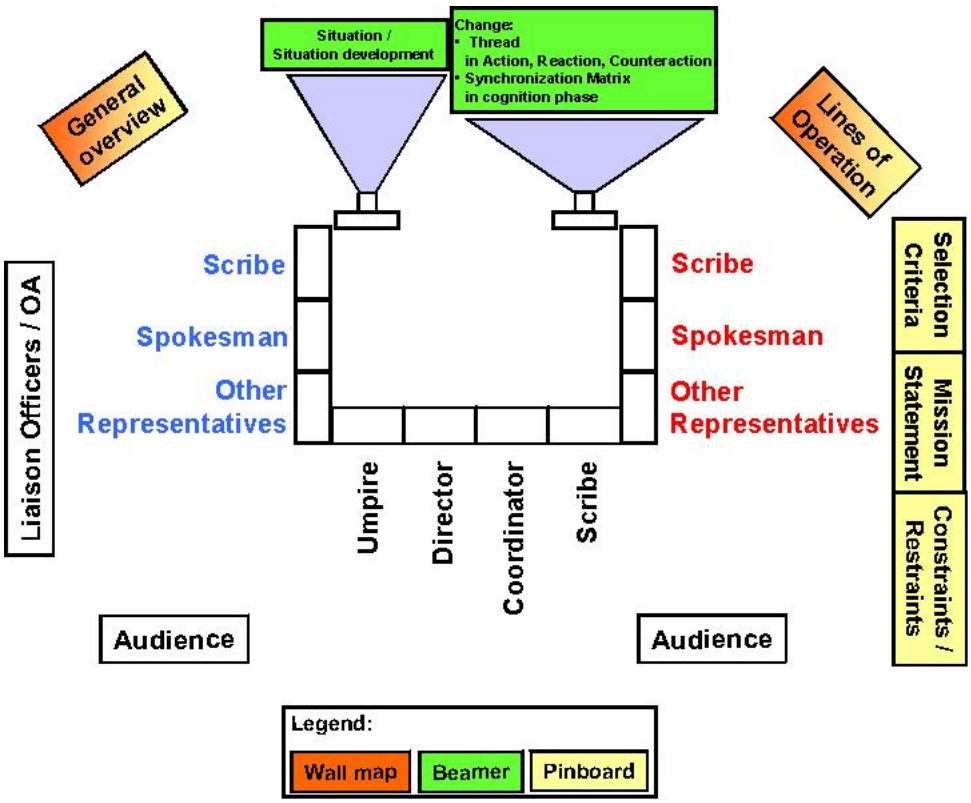

Figure C-2: Arrangement in the Room with 2 Projectors

Major advantages:

- little space requirement,
- clear arrangement,
- easy and quick operation,
- situation display can be saved and thus remains available.

FLOOR MAP AND PROJECTOR

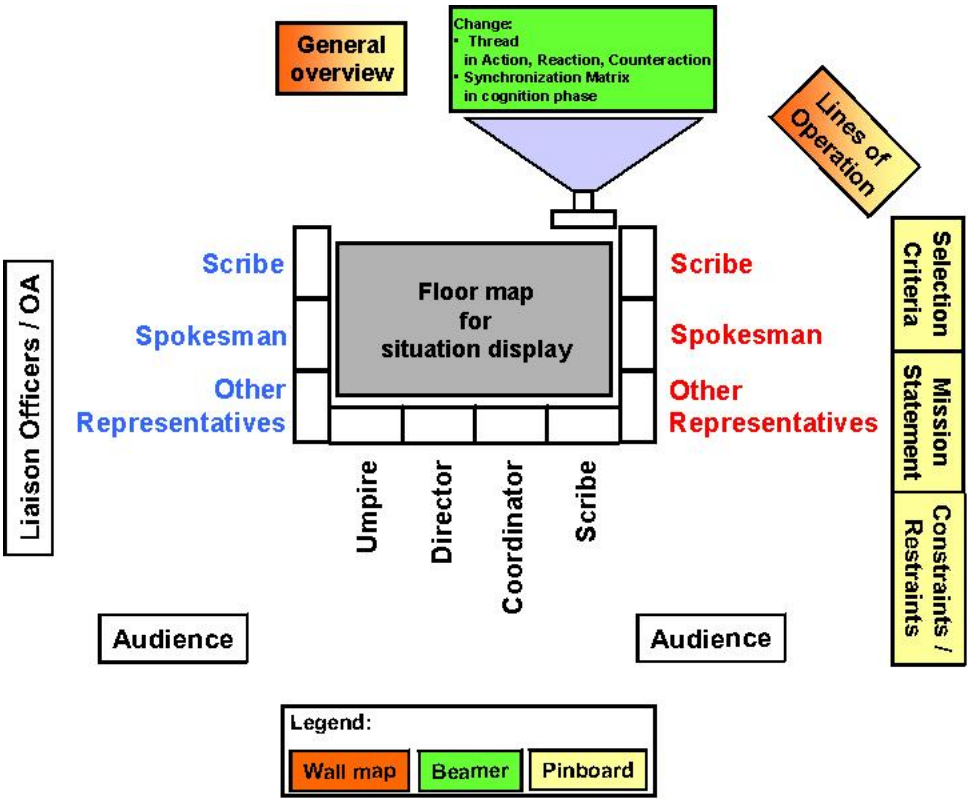

Figure C-3: Arrangement in the Room with Floor Map and Projector

Major advantages:

- only one projector is used,
- simple illustration and placing of forces on the map,
- use of existing maps,
- no distortion of terrain display.

WALL MAP AND PROJECTOR

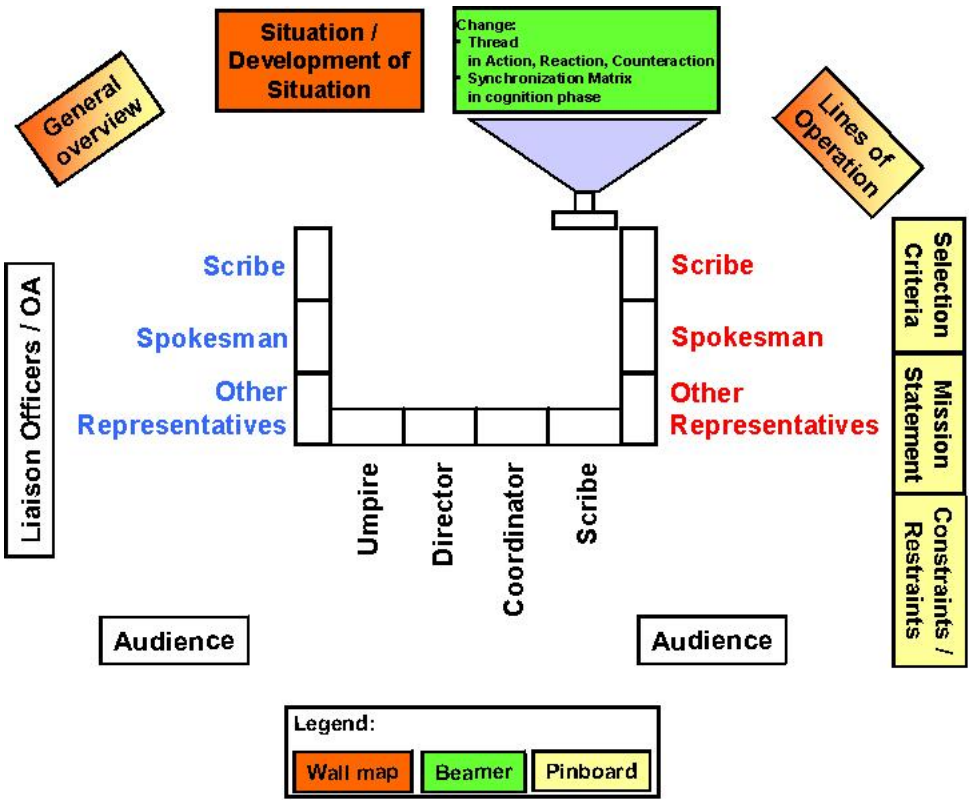

Figure C-4: Arrangement in the Room with Wall Map and Projector

Major advantages:

- only one projector is used,
- use of existing maps,
- no distortion of terrain display.

RECORDING OF INFORMATION

1 The success of the wargame substantially depends on a stringent and comprehensive recording of information as this provides the basis for the subsequent evaluation. This must already be taken into account during the preparation and execution of the wargame. Here, the visualization of information during the wargame plays a decisive role. Principally, pieces of information are recorded in a Synchronization Matrix. The Synchronization Matrix shows the tasks or required capabilities of the corresponding components over time. Especially cross-connections and information about adaptations, risks and temporal dependencies can be emphasized three-dimensionally. For reasons of complexity and later traceability, only electronic securing has proven satisfactory.

2 **PREPARATION**. The subdivision of the segments to be looked at and the elements to be displayed have to be determined for each sequence in close coordination with the head of *JOPG*. Figure D-1 shows the possible basic settings for generating the synchronization matrix.

Figure D-1: Basic Setting for Synchronization Matrix

On the basis of the previously defined segments to be analyzed, the settings of the time bar will be made, and then the components to be displayed will be selected or supplemented, if necessary. Thus, all segments of a sequence to be analyzed can be prepared separately. As a support, the wargaming toolbar offers all necessary functions for later evaluation. Thus all other toolbars can be masked out in order to achieve a maximum display area. It has proven successful to enter data into the matrix in advance, on the basis of the threads. For more clarity and later traceability,

each element of a movement should be displayed in its own color, i.e. one color each for “Action”, “Reaction”, and “Counteraction”.

3 **FILLING DURING THE WARGAME**. During a movement in the wargame, the Synchronization Matrix should not be visible for all participants. The assigned secretary will then trace the movements of the individual parties on the basis of his previously made entries and complete the matrix, if necessary. The secretary only has to enter the “Counteraction”, which was not known before, into the matrix.
During the subsequent cognition phase, the matrix should be presented to all participants present, using a suitable type of projection. Now the cross-connections and other results discovered by the executive and other participants will be assessed and, on order of the director, entered into the matrix and displayed. The following example in Figure D-2 shows a possible visualization.

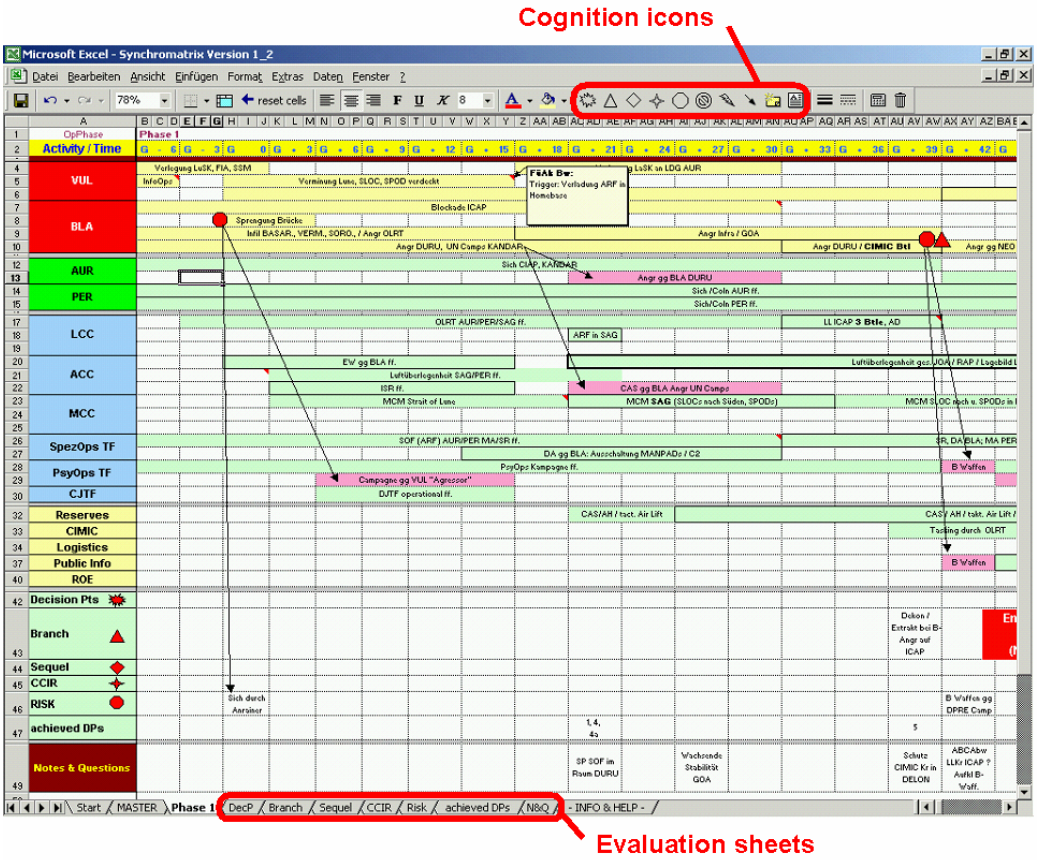

Figure D-2: Example of a Filled Synchronization Matrix

4 The above example shows the various possibilities of an electronic synchronization matrix. The different colors illustrate the individual elements of the movement and thus ensure the required traceability for the evaluation. The icons for the individual information products allow to quickly focus on the fundamental elements of operational conduct, such as the identification of risks or required Branch Plans or Sequels. The lines “achieved DP” and “Notes & Questions” are important fields available for the later evaluation and comparison of the individual COA. In addition, the evaluation sheets, in which the individual pieces of information are summarized in chronological order, provide a compact view of the key information for the entire sequence.

OPERATIONAL ANALYSIS (OA) SUPPORT

1 In the area of OA, a lot of programs to support the *OPP* are available, each of which was developed for special areas of application.

2 The planning guidance of the *JOPG* mostly refers to effects that have to be achieved in an area. Responding to the information provided, for example on air superiority at D+2 above the area xy, concrete possible solutions in the form of troop strength and equipment have to be developed then. Therefore, above all the creativity of planners, liaison officers and OA experts is demanded. Based on the very general planning guidance provided, they have to develop concrete ideas. Guidance can be examined, for example, by varying the ratio of forces, the lines of movement through different terrain, the times scheduled or the sequence of suboperations. The simulation tools designed for this purpose partly are deliberately simple, because they are supposed to provide results that permit making trend statements on a certain problem in a short period of time.

3 Upon completion of the *COA* development, the OA experts examine sections or areas. For instance, it is possible to develop trends and tendencies in deployment planning by means of the *Joint Troops to Task List* (*JTTL)* elaborated, using the Transport Feasibility Estimator (TFE) program. On the basis of Troops-in-Theater times established by the TFE, the meeting with enemy forces can be simulated and analyzed by means of different analysis tools. In this way, it is possible to identify trends in the constellation of forces.

4 Moreover, indications that a *COA* might affect the stability of a government in asymmetric conflict scenarios can be developed using programs such as ZETA. The OA programs specified in the tables below vary strongly in their complexity. Programs such as TOPFAS are simply tools designed to support the planning process. Other programs, such as TFE, are mainly used for analysis purposes. However, what is common to all is the fact that they should be run only by OA experts.

5 In the following, a short survey of the most common programs used by the *NATO Consultation, Command and Control Agency (NC3A)* for OA support at the operational level is provided.

Table 1: Survey
NC3A Aggregated OA Support Programs
- High Intensity Conflicts -

Program	Shorthand Description	Type of Mission	Area of Application	Scenarios Available	Time Required for Preparation and Application	Status	Point of Contact with NC3A (As of: 24.11.2005)
TFE	TFE (Transport Feasibility Estimator) is used to plan the redeployment of troops in the *Concept Development* phase.	Any (Redeployment)	*OPP Concept Development*, Exercise Setup, Experiment Analysis	Zoran Sea Crisis, Atlantis	Scenario Setup: 2 weeks *COA* Analysis: 4 hours What-If-Assessment: 10 minutes	Proto-type (Visual Basic)	Stephan Leitner NC3A ORD Email: stephan.leitner@nc3a.nato.int
LAMBDA AIR	LAMBDA AIR (Land Air Maritime Battle Determination Algorithm) is a tool for estimating attrition rates for air forces clashing at the operational level. It also provides tools for so-called What-If-Analyses.	High Intensity Air	*OPP Concept Development*, Exercise Setup, Experiment Analysis	Zoran Sea Crisis, Atlantis, Joint Defender, AIREX	Scenario Setup: 1 week *COA* Analyses: 4 hours What-If-Assessment: 10 minutes	Excel Spread-sheet	Dr. Uwe Dompke NC3A ORD Email: uwe.dompke @nc3a.nato.int
LAMBDA LAND	LAMBDA LAND is a tool for estimating attrition rates for land forces meeting at the operational level. It also provides tools for so-called What-If-Analyses. Results for Close Air Support can be taken from LAMBDA AIR.	High Intensity Land	*OPP Concept Development*, Exercise Setup, Experiment Analysis	Zoran Sea Crisis, Atlantis	Scenario Setup: 1 week *COA* Analyses: 4 hours What-If-Assessment: 10 minutes	Excel Spread-sheet	Kaplan Sipahi NC3A ORD Email: Kaplan.sipahi @nc3a.nato.int

Table 1: Survey
NC3A Aggregated OA Support Programs
- High Intensity Conflicts -

Program	Shorthand Description	Type of Mission	Area of Application	Scenarios Available	Time Required for Preparation and Application	Status	Point of Contact with NC3A (As of: 24.11.2005)
LAMBDA MARITIME	LAMBDA Maritime is a tool for planning the maritime portions of Joint Operations. It helps defining the time scheduled for redeployment and mine clearing and conducting risk analyses for the areas of underwater warfare, above-water warfare and maritime air warfare as well as estimating amphibious landing operations and maritime portions in deterrence.	Maritime Operations (incl. Sea Control, Embargo)	*OPP Concept Development*, Exercise Setup, Experiment Analysis	Zoran Sea Crisis, Atlantis, Joint Defender	Scenario Setup: 1 week *COA* Analyses: 4 hours What-If-Assessment: 10 minutes	Excel Spread-sheet	Stephan Leitner NC3A ORD Email: stephan.leitner@nc3a.nato.int
GAMMA LAND/AIR	GAMMA (Global Aggregated Model for Military Assessment) combines components for the assessment of attrition and redeployment times in land and air operations to form an overall model.	High Intensity Land/Air	*OPP Concept Development*, Exercise Setup, Experiment Analysis	Zoran Sea Crisis, Atlantis, Joint Defender (Air), AIREX (Air)	Scenario Setup: 1 week *COA* Analyses: 4 hours What-If-Assessment: 10 minutes	Proto-type (Delphi)	Dr. Uwe Dompke NC3A ORD Email: uwe.dompke@nc3a.nato.int Kaplan Sipahi NC3A ORD Email: Kaplan.sipahi@nc3a.nato.int

Table 2: Survey
NC3A Aggregated OA Support Programs
- Asymmetric Conflicts -

Program	Shorthand Description	Type of Mission	Area of Application	Scenarios Available	Time Required for Preparation and Application	Status	Point of Contact with NC3A (As of: 24.11.2005)
GAMMA Incidents Model	The Incident Model is an intelligent agent-based model which permits analyzing the asymmetric threat in operational planning.	Asymmetric Operations *(CRO)*	*OPP Concept Development*, *Plan Review*, Exercise Setup, Experiment Analysis	Zoran Sea Crisis, MNE 4 Afghanistan	Scenario Setup: 4 weeks *COA* Analysis: 5 hours What-If-Assessment: 30 minutes	Proto-type (Delphi)	Dr. Uwe Dompke NC3A ORD Email: uwe.dompke @nc3a.nato.int
ZETA	ZETA (Zoran Effects-Based Tool for Asymmetric Analysis) is a tool for analyzing DIME (Diplomatic, Information, Military, Economy) activities and effects with respect to PMESII (Political, Military, Economic, Social, Information, Infrastructure) factors. It is used, for example, for making statements on the influence of operations on the stability in a region.	Asymmetric Operations *(CRO)*, Effects Based Assessment	*OPP Concept Development*, *Plan Review*, Exercise Setup, Experiment Analysis, EB Planning, EB Assessment	Zoran Sea Crisis, MNE 4 Afghanistan	Scenario Setup: 8 weeks *COA* Analysis: 5 hours What-If-Assessment: 30 minutes	Proto-type (Visual Basic)	Dan Eustace Email: dan.Eustace @nc3a.nato.int Stephan.Leitner Email: Stephan.leitner @nc3a.nato.int

CD

Annex F comes in the form of the attached CD, the contents of which are as follows:

- Wargamine guide with Annexes
- PowerPoint Presentation “Training Assistance Wargaming“
- PowerPoint Presentation “Briefing Wargaming“
- Excel Workbook “Synchronization Matrix“