

A SA-approach for Coordination of Military Air, Sea and Land-operations

Abstract

With the growing numbers of airborne vehicles and more efficient anti aircraft artillery on the modern battlefield it is an increasingly difficult task to coordinate the weapon-systems the military commander wants to deploy in an area of a military operation. The Swedish Defence Forces has therefore, in cooperation with the Swedish Defence Research Establishment and others, conducted a study in how to increase the efficiency for joint operations that involves platforms and weapon-systems in the air space.

The study group has had to deal with organisational problems; structuring the problem with focus on the many different tasks a joint operation has to perform in a variety of scenarios. The aim of the study group has been to identify and solve problems not to employ a specific methodology. A SA-approach has been employed in order to solve this complex problem.

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Introduction

New weapon-systems with longer range and platforms with higher speed, longer range and longer times of operation demands new ways of coordination. In a given structure sub-optimal use of the new systems is easily attained. In order to investigate the consequences for the efficiency of the armed forces, with focus on the anti aircraft artillery, when deploying new types of aerial platforms, an assignment was given by the Army Staff to the Institute for Development of Anti Aircraft Artillery to commence a study on this issue. A study group was formed consisting of officers from the army, navy and the air force and scientists from the Swedish Defence Research Establishment. The study was scheduled to run for a period of one and a half year. The main objective of the study was to identify main problems regarding coordination of activities in the air and suggest solutions. These suggestions together with other conclusions would form the foundation for a new field-manual for coordination of air, land and sea-units.

Problem Formulation

The formulation of the problem is originally developed in dialogue with the client. The first formulation of the study-assignment was analysed by the study-group and the suggestions for alterations in the formulation or change in the boundaries for the study was discussed with the Army Staff, and they rejected or accepted the suggestions from the group. This analysis consists in reality of a quick iteration in the SA-scheme; the general procedure of the study, fig 1.

Up to now the main method of deploying several types of weapon-platforms to one relatively small target area has been to separate them in time and space. In order to achieve maximum fire-power on small, or few, targets the task of this study was to investigate the possibilities to deploy different weapon-systems, carried by different platforms, synchronised in time and space for joint operations. The means for conducting these types of operations are platforms and weapon-systems on land, at sea or in the air. Future weapon-systems demand new ways of organising and coordinating joint operations. The deployment of these new systems is closely linked to the development of new doctrines. New demands is placed on the organisation that tasks these systems.

A number of questions was put forth for further discussion within the study-group. Typical questions were:

- What does the performance of the systems allow the commander to do?
- What synergy-effects can we expect when we deploy different systems at the same time on the same targets?

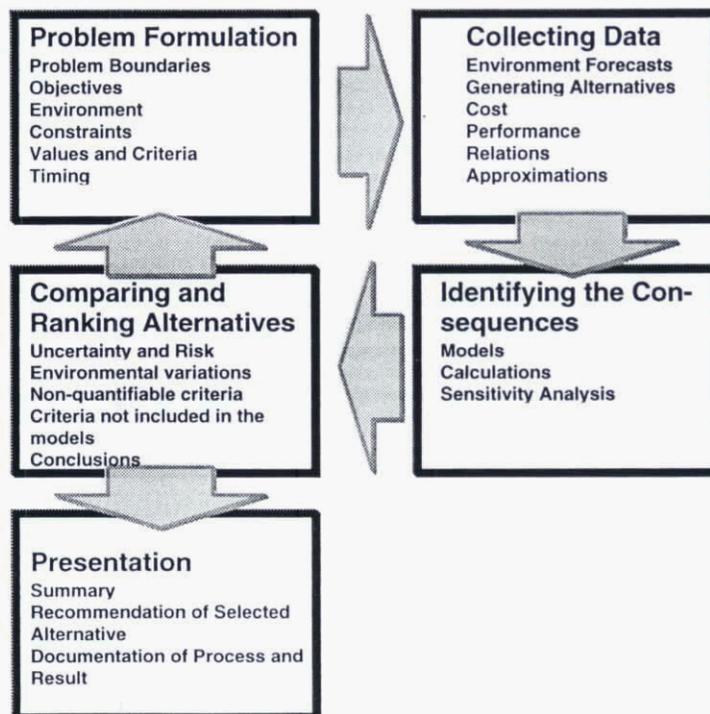


Figure 1. The systems analysis scheme

Methodology

As a fundament for the methodology in the study the study-group used the so called SA-scheme, fig 1. The four corners of the iteration loop in the scheme represents the different stages in the procedure of systems analysis. This scheme or procedure is a sort of basic approach among the study-groups that is working within the Swedish Armed Forces Headquarters.

A study is always preceded by quick loop around the scheme. This pre-study lasts typically one or two days and is conducted by three to four persons. The main purpose of this procedure is to get a fast hold of the problem and to test the problem boundaries

The alternatives to this approach are of course many but the scheme, as shown here, has worked well in the studies that we have been involved with together with the Swedish Armed Forces Headquarters.

Collecting Data

A great effort has been done in study to create a picture of the processes that is going on during a joint operation. External experts has been used to some extent to give the study-group information on various issues regarding problems that concerns the study.

Early in the study we decided to use scenarios as foundations for the process of collecting data. Initially we used a simple approach for the stages during a straight-forward and simple operation:

- Order from higher command,
- Planning,
- Orders to units under command,
- Execution,
- Combat assessment and feedback.

This list was hardly a beginning to the problem, the framework is perhaps still relatively intact, but the list of activities under each of these headlines has grown immensely. During this stage of the process we listed all systems that can be deployed in the area of operation, and identified all conflicts that could occur with other platforms and. A matrix was put together to see the conflicts more clearly. In the matrix we identified if coordination was needed and by which means this ought to be achieved. All the necessary tools to be able to carry out a certain coordination was listed. This is important for the next step in the process when alternative organisations will be generated.

Generating Alternatives

Generating alternatives is an important task for the study. As a first approach we decided to generate non-redundant organisations. After creating an example of an organisation that was non-redundant we created redundancy for the organisation with multiple technical means of communication and alternative chains of command. The conflicts from the matrix was our basis for this work.

Evaluation

This is a part of the study that not yet has been carried out. Complex problems which contains elements of competition and involve the interest of large numbers of people are generally well suited to gaming, and this problem will, partly, be evaluated with some kind of game.

The evaluation-process will mainly consist of a war-game that will be played with military commanders but on a discussion level. Documentation of the game will be important for the evaluation-process within the core study-group. Focus will be on the process of coordination, but with regard to the performance of the units during the game.

Models will be used for details on tactical level. A final assessment will then be made to create an overview of all the information that has been collected during the evaluation-process, and to rank the alternatives. At least one more iteration in the scheme will then still be made to go through all the material again.

Conclusions

The work that has been done will result in a field-manual that will regulate the deployment of forces in areas of operation. The work on the field-manual runs partly parallel to this study. This study is not yet reported and some work still remains to do. The evaluation is not ready and here we still have some important issues that not yet has been worked out.

This study is run by the army and in the beginning we had some problems of getting the air force to participate in the study. These problems have come to a solution, but the importance of straight communication regarding problem formulation early during the dialogue, when it is decided which studies that will be done, can not be over-emphasised.

These kind of studies are closely linked to doctrine , and this give them a "political" dimension. Close contacts with the doctrine development is very important.

Sources

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A SA-Approach for Coordination of Military Air, Sea and Land-Operations

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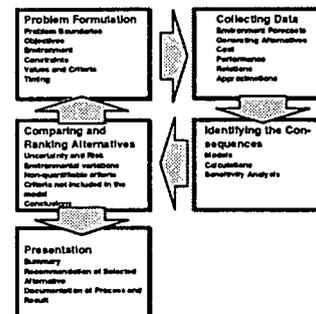
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Introduction

- Problem:
How to achieve fire-concentration with maximum fire-power from platforms in the air, on land or at sea on enemy targets without friendly casualties
- Goal:
Create a suggestions of an organisation that can perform an operation that can achieve this

The Framework and Methodology



Problem Formulation

- Dialogue with the client
- Pre-study - Iteration in the SA-scheme

- Problem boundaries?
- Threat?
- Performance?

Collecting Data

- List of all deployable systems
- Charting the connections between all systems
- Information-flow
- Operational needs
- Future needs and demands

Generating Alternatives

- Alternatives that relies on different philosophies
- First: Make non-redundant systems
- Create redundancy with care and thought
- Cost-estimations

Evaluation

- War-games
- Experts
- Models
 - Details
- Final assessment

Studygroup Processes

- Initially hard to interest the Air Force
- Change of members in the group
- External experts

Conclusions

- Study still in progress
- Problem formulation
- Great effort on collecting data
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- Chosen alternative dependant of doctrine