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MARGIN OF THE DIGITAL THEATRE OF WAR

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INTRODUCTION

I searched in military encyclopedias and the Internet the phrase: "digital theatre of war", and I have found the following:

By Hungarian military encyclopedia ("Katonai kislexikon") [1]:

„The theater of war is a geographical area, where the opposite parties collapse their armed forces, and they keep doing warfare, by solid stratagem. The theatre of war can be continental, oceanic or intercontinental by geographical aspect."

and

„A new type of theater of war appeared beside of traditional (1. continental, 2. air, 3. cosmic, 4. oceanic) the 5th one is: so-called the informational theater of war. It is the cyber space, which is the theory and practice of computers and other automatic devices."

The better one definition of this notion is, by the new distributed lecture notes of the EW department, Várhegyi-Makkay „Basic of the informational warfare" [2]:

„The informational theater of war includes all of real and virtual space, device and system, where or which they acquire, generate, process, use and storage of information."[i]

Because these definitions aren't exact for the ***digital*** theater of war, I propose an own definition (variant) for it:

*„We (can) understand by digital theater of war that virtual space, which includes all of informal items of the **armed combat system** (devices and procedures of the acquiring, generating, processing, using and storage of information, or paralyzing and counteracting of these activities)."*

(There is a question: do the analogue devices and procedures of like this systems fall under digital theater of war?)

The main question is: what do the ***armed combat system*** means?

ARMED COMBAT AS A SYSTEM [3]

I wish to describe a new model of the armed combat by 1st figure, which basic idea is following: the attacker and the defender sides attach to each other in the armed combat as closely as two subsystems of a big system are attached, so, they together become an independent big system. It is the armed combat itself and the relations between its components are the mutual intelligence and strikes. The resources to the combat-activity are the inputs and the losses are the outputs of the system.

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[i] These definitions was translated by author.

#. figure. Armed combat as a system
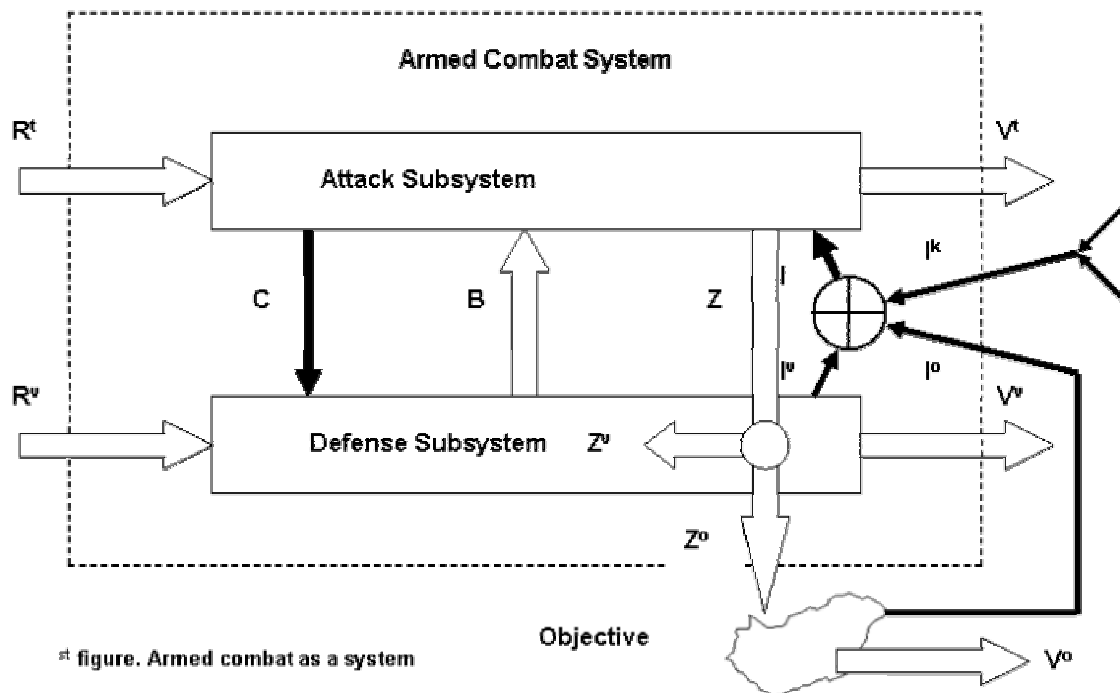
A system does not determinate only by its components and by relations between them, but we must know the purpose of the system, too. The scheme shows the structure of the **Armed Combat System**. The model includes all of characters of a **cybernetic system**.

1. The **Attacker** and the **Defender** sides attach to each other in the armed combat as closely, that they become two subsystems of a big system – of the **Armed Combat System**.
2. **Purpose** of the Armed Combat System is the annihilation of the battle, consequently itself. It seems to be contradictory, until we consider the annihilation of the battle is in interest of both of the subsystems.
3. The **resources** of the subsystems R^t or R^v are their own **main inputs** and they are **main inputs** of the big system simultaneously.
4. The **mutual intelligence** I or C and the mutual strikes Z or B between subsystems are their **inputs** or **outputs**, and at the same time they are the **negative feedback** of the big system.
5. The **losses** of both of them V^t or V^v are their own **outputs**, and with the losses of the protected by the Defense Subsystem objective V^o they are **outputs** of the big system simultaneously.
6. Because the feedbacks are mutual between subsystems, the control and command or the transfer functions of the big system are realized by both of them. Consequently: the Armed Combat System is a **nonhierarchical** cybernetic system.

The main output of the Armed Combat System has gone through the objective, protected by Defense Subsystem. It means the losses of the objective V^o, caused by the attack-system. The protected objective may be important military or civilian establishments, their groups and area.

An Armed Combat System comes into being, when its subsystems, the Attack Subsystem and the Defend Subsystem connected to each other. But, what will the purpose of the big system be? By the fundamental system theory: the purpose of a system is the goal, for which the systems components cooperate.

Such an aim of the Armed Combat System is the **annihilation of the battle**, consequently the **annihilation itself**. It seems to be contradictory, until we consider the annihilation of the battle is in interest of both of the subsystems.

If we accept that purpose of the big system, we shall have to clear, what means the co-operation as an activity in that system. For that reason, let us examine the subsystems roughly.

Attack as a subsystem of Armed Combat System

Attack is an organized system of all strength and military hardware, thrown into battle against the marked out objective, and their activity.

The purposes of the Attack Subsystem are the reconnaissance, destroying and holding down or capturing the objective and paralyzing of the Defense Subsystem, by which the objective is protected.

The inputs of the Attack Subsystem are the following:

R^t - main input is the human, technical and informational resources, assigned to the Attack Subsystem from it's own environment;

I - intelligence input is the information, which includes data

I^o - about the marked out objective;

I^v - about the elements of the Defense Subsystem, their activity and changes information among them; and

I^k - about the neutral environment;

B - undesirable input of the Attack Subsystem is the armed intervention from the Defense Subsystem.

The outputs are the followings:

Z - main output of the Attack Subsystem is the destroying and holding down strikes, which are dealt

Z^o - at the marked out objective and

Z^v - at the Defense Subsystem;

C - undesirable outputs of the Attack Subsystem are the itself emitted and the echo signals, by which the Defense Subsystem is intelligence about it;

V^t - main undesirable outputs are the losses of the attack-system, caused by the Defense Subsystem.

Defense as a subsystem of Armed Combat System

After the short show of the first subsystem, we have to examine the other one of the Armed Combat System roughly, too.

The defense is an organized system of all of strength, military hardware, their activity and tools or steps, destined for paralyzing the Attack Subsystem.

The main purposes of the Defense Subsystem are protecting of the marked out objective and the own elements of the Defense Subsystem from the strikes of the Attack Subsystem.

The inputs of the Defense Subsystem are the followings:

R^v - main input is the human, technical and informational resources, assigned to the Defense Subsystem from it's own environment;

C - intelligence input is the information about the elements of the Attack Subsystem, their activity and changes information among them;

Z^v - undesirable input is the strikes, destroyed the elements of the system and holder down their activity or the changes information among them.

The outputs are the followings:

B - main output of the Defense Subsystem is the armed intervention against the Attack Subsystem for destroying of its elements and holding down their activity or the changes information among them;

I^v - undesirable output of the Defense Subsystem are the itself emitted and echo signals, by which the Attack Subsystem is intelligence about it;

V^v - main undesirable output are the losses of the Defense Subsystem, caused by the Attack Subsystem.

The above-mentioned describe shows, a part of the outputs of the subsystems is the input of the other one at the same time, and these form type internal feedback of the big system. They realize co-operation between subsystems. As a consequence, the Attack Subsystem is the environment of the Defense Subsystem and inversely, which itself changes in a result of the other's activity-

"Co-operation" between subsystems of the Armed Combat System

If the Attack Subsystem and the Defense Subsystem form a big system, then they will have to co-operate for the purpose of the Armed Combat System. Because we have determinate the ***annihilation*** of the battle, i. e. itself, as the purpose of the Armed Combat System, its subsystem must co-operate for that purpose. How do they do that? What is the form of the co-operation between two opposed sides in the course of battle?

The relations between subsystems are antagonistic, because the undesirable information output I or C for one system is indispensable intelligence input to the other one, and the main output Z or B of one system is undesirable, losses cause input for the other one. Consequently, by these connections the subsystems mutually paralyze each other and if any of them raise fighting the battle, because it is fully destroyed or holder down, or because its losses are already intolerable, the big system itself will leave off being. Since, paralyze of the other subsystem is in own interest of both subsystems, their 'co-operation', i.e. the mutual strikes move the big system on the annihilation.

If we accept the above-described verbal system model of the armed combat we shall be able to research it as a non-hierarchical cybernetic system, which includes two subsystems - the Attack Subsystem and the Defense Subsystem. This big system has got two inputs - the resources of the attack R^t and the defense R^v - and three outputs - losses of the attack V^t and the defense V^v or the objective V^o. The last one is realized throughout the marked out objective, charged by the Attack Subsystem and protected by the Defense Subsystem, as a consequence of the Attack Subsystem's strikes Z^o. The internal feedbacks of the Armed Combat System are the mutual intelligence I^v or C and the mutual dealing blows Z^v or B of the subsystems.

A very graphic example of the Armed Combat System (which is the "most digital" form of Theatre of War) can be the Air Defense Combat System model in the 2nd Figure.

Air Defense Combat as a system

Although, Air Defense Combat System is a concrete form of the Armed Combat System, and it doesn't form a hierarchic system, its subsystems are regular hierarchic systems. Accordingly, two main subsystems of the Air Defense Combat System are the **Air Attack Subsystem** and the **Air Defense Subsystem**. Fundamental elements of all of them are the *Intelligence,* the *Command and Control* and the *Executive* sub-subsystem.
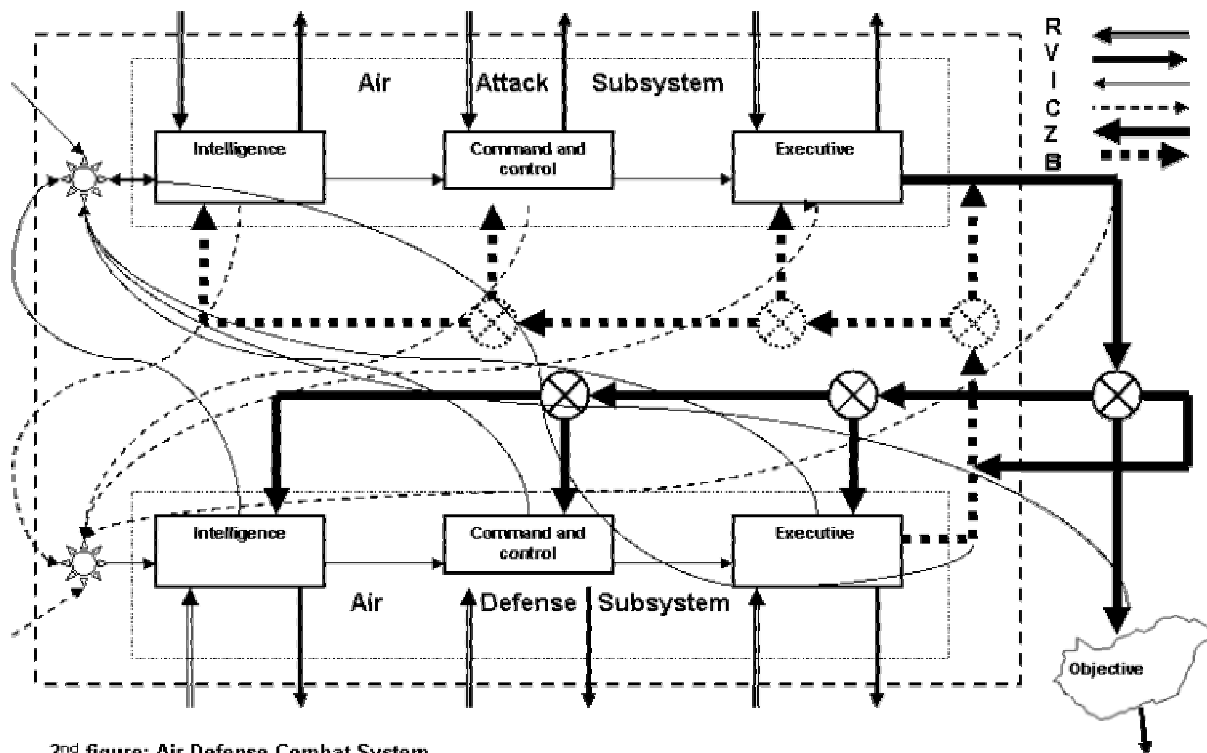
2nd **figure: Air Defense Combat System**

The **main inputs** of the Air Defense Combat System are the *resources* of its subsystem (**R**), which get in the system across sub-subsystems. Similarly, the **main outputs** of the system are the *losses* of its sub-subsystems (**V**).

First of the **feedbacks** of the Combat System is the *information feedback*.

The intelligence sub-subsystem of the Air Attack Subsystem gets information (**I**) about:
- geographic and weather **environment**;
- **objective** of the air attack;
- **position** of the surveillance or executive and command-control elements of the Air Defense Subsystem;
- **activity** of the surveillance or executive elements of the Air Defense Subsystem;
- **change of information** among the surveillance or executive elements and the headquarters points of the Air Defense Subsystem.

The intelligence sub-subsystem of the Air Defense Subsystem gets information (**C**) about:
- weather **environment**;
- **air position** of the surveillance or executive and command-control elements of the Air Attack Subsystem;
- **activity** of the surveillance or executive elements of the Air Attack Subsystem;
- **change of information** among the surveillance or executive and the headquarter elements of the Air Attack Subsystem.

The other forms of the **feedbacks** between Air Attack and Air Defense subsystems of the Air Defense Combat System are the *mutual strikes*, which move the big system on the annihilation.

The execution sub-subsystem of the Air Attack Subsystem strikes against the marked out objective and the Air Defense Subsystem, which protects it. Air strikes (**Z**) can be destroy or paralyze of the objective and elements of the Air Defense Subsystem with:

- **paralyze or mislead** intelligence activity and internal change of information of the Air Defense Subsystem;
- **destroy** elements of the Air Defense Subsystem;
- **prevention** Air Defense Subsystem **from doing** deal a blow against air objects.

The execution sub-subsystem of the Air Defense Subsystem prevents (**B**) Air Attack Subsystem from doing air strikes with:

- **paralyze or mislead** intelligence and navigation activity and internal change of information of the Air Attack Subsystem;
- **destroy** air elements of the Air Attack Subsystem;
- **prevention** Air Attack Subsystem **from doing** deal a blow against objective and elements of the Air Defense Subsystem.

CONCLUSION

The model, proposed by me, makes the research of the mark of the digital theater of war possible with very rich cybernetic tools. Of course, for the detailed examine of the Armed Combat System, we have to open his "black-boxes" to the elements of the subsystems, their inputs, outputs and the internal feedbacks.

But, where are the marks of the digital theater of war?

The virtual space of the digital theater of war become more and more wide with the information explosion, and when we approach his margins, they will be farther and farther.

References

[1] URL=http://www.zmne.hu/tudtev_uj/szotar/tartalom.html

[2] Várhegyi-Makkay: *Az információs hadviselés alapjai. (Basic of the informational warfare* - distributed lecture notes), ZMNE 2001.

[3] Seres György: *A fegyveres küzdelem, mint rendszer. (Armed combat as a system* – DSc thesis), ZMNE 1990.