

**Miklós Zrínyi National Defense University**  
**Doctoral Council**

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Major László Kovács

**ADVANCED**  
**ELECTRONIC INTELLIGENCE ASSETS AND PROCESSES**  
**AND THEIR USE IN THE**  
**HUNGARIAN DEFENSE FORCES**

PhD dissertation  
author booklet

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## **The scientific problem:**

I have divided into two close relation parts the scientific problems:

**1. The modern armed forces use advanced electronic assets, systems and tactics, which make impossible to get information with traditional electronic intelligence methods about them. From the decision makers to shooters the information flow is based on computer aided networks, which are encrypted and very fast, that's why we have to find new electronic intelligence assets and processes.**

**2. Using of the information technical and technological revolution's products in the fields of military leadership or in any military operation have generated, that today is not enough to get information from one single intelligence source to create a clear picture about the real situation or the all elements of the operation. This has major effects on the war, because this single source can give only a piece of information. If we get information in this way this does not satisfy the requirements of intelligence (punctuality, accuracy, authenticity, etc.). That's why we have to use the intelligence sources in the most widely spectrum and we have to summarize these sources of data. However, the human manual work is not enough to perform these progresses. Therefore, we have to find such methods that are able to process the large amount of data, and can product information from these data that is usable in the decision making process.**

## **Research aims:**

1. My first aim was to analyze and examine the role of information in the 21<sup>st</sup> century, and its effects on warfare, which change direct and indirect way the methods, tactics and techniques that we used before in the military affairs.

2. My second goal was to explore the technical and technological products of information age which are usable in the field of electronic intelligence to support to reach the information dominance.

3. My third aim was to create and work out the basis of a modern data process based intelligence center, and determine its operational requirements and principles.

4. The fourth goal was to work out the main requirements of modern electronic intelligence systems' structure, and their operational processes.

### **Research methods:**

As research methods I used: literature research and organization in very wide spectrum; observation; critical adaptation; second analysis of researches; analysis; synthesis; induction and deduction.

### **Examinations:**

**I built up my dissertation in the following structure to reach my research aims:**

#### **1. Chapter:**

I analyzed and examined the role of information in the 21<sup>st</sup> century's societies, than I deduced conclusions from the information effected military affairs. I looked over and summarized the security and defense political and technical risks and challenges, which we have to prepare our armed forces for, including the Hungarian Defense Forces.

Thereafter I analyzed the main requirements of information gathering, the process of intelligence, the fundamental definition of intelligence, surveillance and reconnaissance. I determined what I mean under electronic intelligence.

#### **2. Chapter:**

I analyzed the advanced electronic intelligence assets, which could be usable in the Hungarian Defense Forces, and can answer the new risks and challenges on electronic intelligence of 21<sup>st</sup> century.

### **3. Chapter:**

I analyzed which methods could be able to handle the large amount of data and information in the military affairs. I worked out the fundamental principles of an all source analysis system which based on data fusion for the Hungarian Defense Forces.

### **4. Chapter:**

I used the conclusions, solutions, suggestions of the foregoing chapters, and worked out three unmanned aerial vehicles based electronic intelligence systems in different versions.

After every chapter I summarized my analysis and examinations, and I took conclusions from them. At the end of the dissertation I summarized these conclusions, and these are the basis of my new scientific results.

### **Summarized conclusions:**

1. I analyzed the 21<sup>st</sup> century's technical and technological revolution and I found as conclusion that they changed our whole life – the societies, the economics, and the military affairs as well. Information and knowledge have become the most important facts. I analyzed the new risks and challenges and I drew attention the fact that the time has also very important role inside the information and knowledge. Information and time have close relation. The main aim of the information operation is to reach the information dominance for get operational superiority. The main goal is to minimize our decision making time and maximize the enemy's one. To reach this goal we must provide optimal amount of information for the commander.
2. To use the foregoing conclusions I proved that the Hungarian Defense Forces need new intelligence assets, because we are not able to get enough amount and quality of information without these advanced assets and systems.
3. I analyzed the advanced electronic assets which are suitable for using on the field of electronic intelligence in different spectrum. These new and advanced assets are the following: in the optical spectrum – digital cameras, digital video cameras, infra red cameras, in the radio wave spectrum: the new principles based SIGINT assets,

LIDARs, and SAR radars. These assets are suitable for use onboard unmanned aerial vehicles because of their weights, and measurements.

4. Based on my analysis I have found that the dynamic operation, and fast changes, or the fact that we have to move closer to the information source – because it is hidden, and its decreased electromagnetic radiation – require new electronic intelligence process. I proved that the unmanned aerial vehicle as up to date platform of the electronic intelligence assets could usable in the Hungarian Defense Forces.
5. I analyzed the processes that make possible to use multi intelligence sources to get information. On the base of this analysis I determine the main requirements and principles of a data fusion based all-source intelligence center which is able to support the commander on every level in war and crisis response operation as well.
6. Based on my analysis I have found analysis that to create an effective intelligence system there are need to use advanced and integrated computer based information, data exchange and process systems, which can use effectively in the information support of the operation.
7. I make recommendation for three versions of unmanned aerial vehicle based electronic intelligence system, and I proved their usability in the Hungarian Defense Forces, then I verified the increased capability, that we can reach with using these systems.
8. I analyzed the connection between the unmanned aerial vehicles based electronic intelligence and data fusion based all-source intelligence and I pointed out that it is a usable configuration in the intelligence support.

### **New scientific results:**

- 1. I analyzed the information technical and technological revolution products and I take conclusions from these analyses, which are the basis of my recommendations. These recommendation refer to new electronic intelligence assets which are able to support the high information requirements of modern armed forces, and which are usable in the Hungarian Defense Forces.**
- 2. I analyzed the role of data fusion and I proved that the creation of optimal amount of information has to build on all-source intelligence systems which use data fusion to process data.**
- 3. I determine the main requirements of data fusion based all-source intelligence system and its operational information flow, which can support the decision making process with optimal information.**
- 4. I determined the main requirements and principles of new unmanned aerial vehicles based electronic intelligence systems and I worked out three different versions of them.**

### **Recommendations of the dissertation:**

- 1. I recommend my scientific researches – the principles of data fusion based all-source analysis system and principles and main requirements of the new unmanned aerial vehicle based electronic intelligence systems – to use in set up integrated automatic intelligence system of Hungarian Defense Forces.**
- 2. I recommend using my dissertation or its parts in the military technical higher education.**

## List of publications:

1. *László Kovács – László Ványa:*  
The new perspectives of the Geographical Information System based planning and command and control in the military education.  
(A térinformatikai alapú tervezés, vezetés oktatásának új lehetőségei a katonai felsőoktatásban)  
Proceedings of 8<sup>th</sup> GIS in the higher education  
University of Gardening and Food industry, 1999.
2. *László Kovács:*  
The „All-source Analysis system – ASAS” as the key element of intelligence and electronic warfare XXI.  
Hadtudományi tájékoztató 1999/7.  
MoD, Budapest, 1999. p.: 157-168.
3. *László Kovács:*  
Connection of the all-source intelligence and the unmanned aerial vehicles)  
(Az összadatforrású felderítés és a pilóta nélküli felderítő repülő eszközök kapcsolata)  
Repüléstudományi közlemények, Vol.: 12. No.: 29.  
MZNDU, Budapest, 2000. p.: 231-239.
4. *László Kovács:*  
Battlefield Visualization,  
”Advanced military technologies in the 21<sup>st</sup> century – the new intelligence and electronic warfare systems” international conference proceedings  
MZNDU, Budapest, 2000. p.: 292-299
5. *László Kovács:*  
Electronic intelligence, electronic warfare  
Térinformatika, 2000/7. p.: 13-15.
6. *László Kovács:*  
Airborne electronic intelligence  
Repüléstudományi közlemények különszám  
MZNDU, Budapest, 2001. p.: 89-99.
7. *László Kovács:*  
Thoughts about the connection between today’s technology and the digital battlefield  
Hadtudományi Tájékoztató, 2001/7. p.: 65-72
8. *László Kovács:*  
The roles of electronic warfare in the 21<sup>st</sup> century  
(Az elektronikai hadviselés helye és szerepe a XXI. századi hadviselésben)  
Hadtudomány, 2001/2. p.: 33-41.
9. *László Kovács:*  
The new weapons of the 21<sup>st</sup> century’s electronic warfare: the electromagnetic pulse weapons.

- (A XXI. század elektronikai hadviselésének új fegyverei, az elektromágneses fegyverek)  
Hallgatói Közlemények Vol.: 5. , No.: 1.  
MZNDU, Budapest, 2001. p.: 103-112. ISSN: 1417-7307
10. András György – *László Kovács*:  
The comparison of the American All-Source Analysis System (ASAS) and the Hungarian electronic warfare command and control systems  
(Az amerikai "Minden Adatforrást Elemző Rendszer" (ASAS) és a magyar elektronikai-harc vezetési komplexumok rendszertехnikai összehasonlítása)  
Hallgatói Közlemények Vol.: 5. No.: 1.  
MZNDU, Budapest, 2001. p.: 112-128. ISSN: 1417-7307
11. *László Kovács*:  
Afganistan: Information Warfare and the high tech  
(Afganisztán: információs háború és csúcstechnika)  
Új Honvédségi Szemle, 2002/2. p.: 17-27. ISSN: 1585-4167
12. *László Kovács*:  
War on the digital battlefield: Thoughts about the C4I systems  
(Harc a digitális hadszíntéren: Gondolatok a C4I rendszerekről)  
Új Honvédségi Szemle, 2002/3. p.: 43-53. ISSN: 1585-4167.
13. *László Kovács* – *László Ványa*:  
Electronic Warfare in the 21<sup>st</sup> Century's Air Force  
(Elektronikai hadviselés a XXI. század légierijében)  
Repüléstudományi Közlemények – Future Aviation Technologies first international symposium proceedings  
MZNDU, Budapest, 2002. 2<sup>nd</sup> book p.: 75-81. ISSN: 1417-0604
14. *László Kovács*:  
The new principles and assets of electronic intelligence on the digital battlefield  
(A digitális hadszíntéren folyó elektronikai felderítés új elvei és eszközei)  
PhD students Conference proceedings, MZNDU, Budapest, 2001. p.: 209-221.
15. *László Kovács*:  
Digital War?  
(Digitális háború?)  
Chip Magazin Vol.: 15. No.: 2. 2003. February, p: 20-23 ISSN: 0864-9421
16. *László Kovács*:  
Battlefield of the future, AARMS, Volume 1, Issue 2., 2002, p.: 195-209.  
ISSN: 1588-8789
17. Dr. Imre Makkay – Dr. Zsolt Haig – Dr. Sándor Vass – Dr. *László Ványa* – Zoltán Gácsér – András Molnár – *László Kovács*:  
New Perspectives for Guidance and Propulsion System of UAVs  
NATO RTO AVT panel „NOVEL VEHICLE CONCEPTS AND EMERGING VEHICLE TECHNOLOGIES Symposium” proceedings,  
Brussels, 2003. April (Under publication)



18. *László Kovács:*  
Battlefield on the internet: Iraqi war  
(Csatatér az interneten: iraki háború)  
Chip Magazin, Vol.: 15. No.: 6. 2003. June, p:  
ISSN: 0864-9421
19. *László Kovács:*  
Screenplay of an information attack (case study)  
(Egy informatikai támadás forgatókönyve – esettanulmány)  
Az informatikai biztonság kézikönyve  
Verlag Dashöfer Szakkiadó Kft. és T. Bt.  
Budapest, 2003. 3. 6.1. chapter p.: 1-25.

### **Professional-scientific biography**

#### **Personal data:**

Name: László Kovács  
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#### **Schools:**

2002: NATO Orientation Course, Hague, the Netherlands  
2001: Miklós Zrínyi National Defense University Partnership for Peace  
Language Training Center English STANAG language training  
1999-2002: Miklós Zrínyi National Defense University PhD student  
1997-1999: Miklós Zrínyi National Defense University, Faculty of  
Management and Organization, Military technical manager  
profession  
1994-1995: Miklós Zrínyi Military Academy English course  
1988-1991: János Bolyai Military Technical College Electronic Warfare  
profession  
1984-1988: Ferenc Bajáki Technical High School, Budapest

**Assignments:**

- 2002-: Miklós Zrínyi National Defense University, Faculty of Management and Organization, Electronic warfare department, associate professor
- 1992-1997: 5<sup>th</sup> Electronic Warfare Regiment, Kiskunfélegyháza, platoon leader, company commander, chief of staff of battalion
- 1991-1992: 69. Radio-jamming Battalion, Békéscsaba, platoon leader

**Language knowledge:**

- 2001: English STANAG 3333  
English state exam advanced level „A”  
German state basic level “C”
- 1995: English intermediate “C”

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