

AUTHOR'S SUMMARY OF PHD DISSERTATION

ZRÍNYI MIKLÓS
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Ildikó Kovács

**Experiences and Perspectives of the
Hungarian Participation in the
International Security and Defence
R&D Programmes, in Regard to our
NATO and EU Membership**

Author's summary and official reviews

Budapest
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THE DEFINITION OF THE SCIENTIFIC PROBLEM

The events of the 11th of September 2001. called the attention to the presence of a completely new, invisible enemy, the emergence of new threats, and at the same time the vulnerability of the modern societies.

A comprehensive understanding of security was necessary, which increased the circle of threats at the same time.

Besides the traditional governmental players in security policy more and more role is given to the so called non-governmental players (international organisations, multinational companies, non-governmental organisations, as well as the international criminal and terrorist groups). The traditional security risks and the new, often global-scale emerging or spread threats are simultaneously present in the restructuring international system. The new type threats and challenges are more changeable, less visible and less foreseeable. The threats can emerge on global, regional and internal level, however in most cases they emerge at the same time rather than separately, increasing each other.

The **collapse** of the geopolitical blocks meant the most important change of the '90s. The relative stability of the two-pole world, divided by the super powers and their allies was replaced by a new world full of uncertainties and challenges never known before. In this new world the hegemony of the USA seemed to be determining.

By shaping up of the new world the principles of warfare must be revised as well: the military forces relying upon the traditional armaments and concentrating great military forces in one region must be replaced by smaller, more flexible, units quick to be mobilised, provided by effective weapons, that can be deployed in the out-of territory missions (e.g. NATO Response Forces). The efficiency of command and control, the rapid reaction capability, mobility and protection of military forces, as well as ensuring the deployment capability and sustainability are those capabilities that require improvement. At the same time these new capabilities determine the priorities of the defence R&D.

A changeable security environment requires innovative R&D, to prevent the potential conflicts, and to prevent as well as overcome the asymmetric attacks.

In the new situation science and technology development are given a decisive role for the improvement of military capabilities. The technologies and sciences for providing rapid mobility, enhanced capability of collaboration, *interoperability of the nations, as well as education, and intelligence service and awareness are essential for the restructuring. During the last few years the new technologies dramatically enhanced the military effectiveness.* The tendency of rapidly developing technologies is likely to continue. Technologies like *nanotechnology, communication and informatics, biotechnology, lasers and sensors, robotics and automation lead to new solutions and capabilities, never even imagined before.* Using space and cybernetics creates new challenges and opportunities for the military operations.

Globalisation is rapidly growing, and already reached such a level, especially in the field of *technology, information technology, transport, trade*

and financial areas, as well as public health, which – besides offering numerous advantages – creates security threats of new types.

Access to technological information for manufacturing and using **weapons of mass destruction (nuclear, radiological, chemical and biological) and their carriers means strategic threat.** This threat is increased by the potential exploitation by terrorists. Chemical and biological weapons are especially dangerous, since they are relatively easy to be produced, hard to be controlled, and they are more likely to be used in regional conflicts or international terrorist attacks.

To avoid the disadvantageous consequences of our long term backwardness, it is our priority task to catch up with the information and telecommunication level of the developed world. Besides providing the technical background of the infrastructure of informatics it is important to pay attention to the protection of these systems, and create adequate reserves. On one hand **informatics** offers numerous possibilities for the society, on the other hand it enhances its vulnerability. **Vulnerability** of the computer networks and systems, overloading them, stealing information, **virus attacks and disinformation are risks.**

Environmental protection and civilisation related threats reaching **beyond borders** mean great challenges for mankind. Our natural resources, protection of the environmental areas and values, and the environmental balance became an increasingly heavy burden to the societies. **Global problems** like perish of the rain forests, **damage of the ozone layer**, greenhouse gases, growing **contamination level of the air, water and soil** are dangerous for the whole Globe. The **environmental threats** indirectly affect the health of the population, and at the same time facilitate the appearance and scattering of **dangerous epidemics and infections.** In the future we shall have to count with public health crisis of great range

By taking part in security and defence research and development co-operations, as well as by **utilising the security and defence R&D** achievements, Hungary will be able to keep her international status and will be able to strengthen her national safety and security.

Definition

“Defence and security R&D means the manufacturing of all those products, processes, technologies, or all those processes aiming at their manufacturing, that affect the general safety and security of the individual and/ or the society, especially the national security, economic and industrial security, environmental safety, information and technology security, food safety, transport security.”

In the ‘90s, prior to her NATO and EU accession **Hungary went through tremendous economic, political and societal changes.** Hungary inherited an **internationally acknowledged, strong R&D sector,** which on the other hand was state-owned, financed by the state, and separated from the market. Due to the financial constraints, the gross national expenditure as the percentage of the GDP was constantly decreasing in the 80’s, and dropped significantly in 1989 and 1990.

The change of the political system affected the **defence industry** in a fundamental, staggering way. Loosing the foreign markets due to the **collapse** of the previous alliances, and at the same time **loosing** the domestic **markets** due to the reduction of the participation of the state caused structural **crisis**, accompanied with the restructuring of ownerships, and significant capacity loss. Without orders, the **research and development background** connected to this division **suffered great decline** as well. This way the domestic defence industry fell back more and more, regarding both the products and technologies. It was not able to compete on the international markets.

Contrary to the traditional defence industry, we must estimate the “**security industry**” in a much **wider range**. It includes individual protection, bio-protection, defence against crime and terrorism, protection of information and communication facilities, transport and energy infrastructures, border control, and catastrophe management. Defining the **multilayered security industry** is in progress. At the same time the security and the defence branch are closely connected, especially regarding the technologies and processes.

The changeable threats and their consequences can be prevented and managed in time and efficiently exclusively **by utilising the most state-of-the-art processes and technologies**. By the analysis of the national and international processes it is evident, that security and defence R&D has to be based on **high technologies**. For this purpose it is necessary to follow the achievements of the **basic and applied research fields from security and defence point of view**. It is necessary to support the security and defence related R&D applications, and to harmonise the defence innovation and procurement policy with the management of the knowledge and technology base.

I have based my research work on the following **scientific problems**:

- *In Hungary the political, economic, societal and technological environment of the security and defence R&D has significantly changed since the transformation of the political system. The security and defence oriented industrial research laboratories and research institutes lowered their activities due to the lack of orders, many of them were terminated by the middle of the 90's, and the well-educated, experienced research and development teams scattered. Thus Hungary will have to be endowed - again - with such capabilities which she does not have at all, or are not adequate. In my opinion it demands a strong, dynamic, competitive, and first of all innovative security and defence industry, which is capable to design, manufacture and transport the means for the broad spectrum of safety and security, in sufficient volume and at competitive price. For this purpose it is essential to involve the R&D and innovation capacities in the defence and security research activities.*
- *By the Euro Atlantic integration Hungary has joined several international organisations – NATO (12 March 1999), EU (1 May 2004.), European Defence Agency (EDA) – which play important role in the international co-ordination of security and defence R&D, assisting international co-operation. The expectations were not exaggerated, since the national players of this field were fully aware of*

our technological backwardness and our limited resources restraining our international chances. The lessons learnt from the international memberships give evidence that numerous circumstances pull Hungary back from her satisfactory participation in these international organisations. It is a must to create such circumstances that the national R&D&I capacities can be integrated into the goals of NATO and EU, thus producing profit for the national economy.

RESEARCH AIMS

According to the scientific problems introduced above I have summarised my **research aims** as follows:

- analysing the Hungarian participation in the NATO Research and Technology Organisation, in order to determine the conditions required for enhancing our participation in the substantial activities, putting the emphasis from our formal participation onto the real work;
- analysing the experiences of our participation in NATO's science and technology (S&T) co-operations, in order to determine the priorities and most important directions for the international S&T co-operation strategy of the National Office for Research and Technology;
- by analysing the Hungarian opportunities in the activities of the Western European Armaments Group and the European Defence Agency, determining those conditions which are required to catch up in the international security and defence R&D&I co-operations;
- analysing the security R&D&I programmes of the European Union in order to determine, to what extent the human and technical resources of the Hungarian security research allows us to join the security and defence co-operations.

RESEARCH METHODS

During the investigations of the scientific problems, according to my research aims, I used the following methods:

historical analysis: studying and analysing laws, legal regulations, Terms of References of NATO and EU bodies, Communications of the European Council, NATO and EU documents and decisions, electronic publications, information available in the Internet;

interviews: consultations with internationally acknowledged Hungarian and foreign researchers, experts, decision makers, members of various national and international committees;

comparative critical analysis: compare views collected from the consultations;

analysis and synthesis: determining the institutional, legal and financial background as well as the human resources of the security and defence R&D&I.

In the first chapter (Our Scientific and Technological Co-operation with the NATO Research and Technology Organisation) I introduce the NATO Research and Technology Organisation (RTO), the mission, tasks and structure of the RTO. I provide a detailed analysis of the Hungarian participation in the activities of the Organisation. The first steps of joining the NATO R&D organisation were successful. We joined in the work of the whole organisation. After the first successes however, there was a sudden stop, and from 2004 our participation started to decline. Nevertheless, it is a fact that only countries and regions of strong defence and security background are able to enforce their economic interests. Thus **this decline has to be stopped**, and this practice has to be turned back. ***This requires the following measures:***

- introducing the RTO and its activities at a wide range, not only in the institutions of the Ministry of Defence and Armed Forces, but in the higher education and defence sector as well. For this we must use the press, the events of the defence sector, the forums of the Ministry of National Development and Economy, and the Internet. We must publish RTO related news on the website of the National Office for Research and Technology, advertising the opportunities of participation for the researcher community and the industry;
- the continuous attendance at the Panel Business Meetings, at the sufficient professional level must be ensured. We must gradually join the activities at the Technical Team level. It used to have administrative difficulties as well (it was very slow to get the necessary security clearances), but due to the excellent co-operation with the National Security Authorities this process can be shortened, eliminating this problem;
- the mechanism for financing the Hungarian participation in the RTO activities must be elaborated, using the Research and Technology Innovation Fund;
- until 2002 the predecessors of the National Office for Research and Technology regularly launched calls for proposals to support defence R&D. Based on the global tendencies, the defence and security areas are expected to get gradually closer, overlapping at numerous fields. Thus, within the application system of the National Office for Research and Technology, we must work out a call for proposals for the regular support of the defence and security research.

As the result of the above measures, the Hungarian researchers would be able to join the substantial activities of the NATO RTO, beyond the formal participation, increasing the international repute and acknowledgement of the Hungarian defence research and development, contributing to the enhancement of Hungary's and NATO's defence capabilities.

Out of the above measures I have worked out the following ones:

- I have worked out the text of a call for proposals to finance the Hungarian participation in the activities of the NATO RTO, which is expected to be launched by the National Office for Research and Technology from 2009;

- I have worked out the text of the dedicated defence and security programme within the call for proposals of the National Technology Programme.

In the second chapter (Our participation in the NATO Science Programme) I introduce the NATO's civilian Science Programme, then its change to NATO Science for Peace and Security Programme, which was the first programme to support specifically security related research.

By the analysis of *our participation in the NATO Science Programme and in the NATO Science for Peace and Security Programme* I have pointed out which are *the most popular target-countries for the Hungarian researchers' international co-operations, and based on this I have put together the international science and technology (S&T) co-operation strategy of the National Office for Research and Technology*, in compliance with the international relations strategy of the Republic of Hungary as well as the concept of the international economic co-operation.

The **goal of the international S&T co-operations** is to support the Government's R&D&I efforts and assist the domestic economic exploitation of scientific results, by the involvement of international resources and by the improvement of bilateral relations.

The Hungarian researchers bring home experiences, results, technologies of that kind, which attracts the researchers from Eastern countries to Hungary. Thus Hungary – from her central geological situation – should be a centre of technology transfer. Our main goal is to make international grand projects leading to concrete working partnerships, which result economic and societal profit for Hungary in a short or medium term. Building economic relations, as well as starting R&D&I co-operations in which the foreign partner also involves significant resources should receive more emphases.

As for reaching the strategic goals, in the bilateral relations setting up priorities is required, I have selected the partner countries of outstanding importance, and the important partner countries.

In the third chapter (Participation in EU's Defence Research Collaborations) I introduce the Western European Armaments Group (WEAG) and the European Defence Agency (EDA). I analyse the Hungarian participation in the activities of the WEAG and the EDA, especially in the two **research and development co-operation programmes – the Force Protection Programme and the Joint Investment Programme on Innovative Concepts and Emerging Technologies (JIP ICET)** - of the EDA.

The EDA activities – besides our NATO membership - enhance further Hungary's opportunities to participate in international defence technology projects. However in the EDA - exactly like in the NATO RTO - while providing full membership on the committee level, if we examine our activities at the substantial working level, the level of the joint projects, we find the lack of Hungarian participation.

The EDA has started to create the European Defence Acquisition Market. Opening the national markets started on 1 July 2006 by creating a Code of Conduct, which provides access to the defence procurement data. Hungary joined this Code of Conduct on 1 July 2007.

It is evident that the expenditures will be recovered for the state, if we recognise the economic importance of the defence and security sector. It is also evident, that its development, based on high technologies, its activities by creating products and services of high added value will have a positive influence on the knowledge based economy, the general technological development, the export capacity, the creation of working places and through all these the national incomes.

The **defence and security** policy has to be harmonised with the economic policy on the governmental level, and on the **long term** this **policy** has to be applied more **consequently** and **consciously**, in order to ensure the start of a competitive future sector.

I find governmental level intervention necessary in the following areas:

- ensuring the **long term support** of the defence and security expenditures from the central budget;
- establishing a **development and acquisition policy** based on **stable budget resources**, taking into account the national economic development concepts;
- using the means of the **offset** programmes to **support technology transformation and innovation**, for business investment;
- **strong support for the defence and security related R&D activities and innovation**, and for reaching the goals, actualizing the draft of the security and defence research and development strategy, finalised by January 2006, and have it approved by the government;
- putting together the plan of measures of the security and defence research and development strategy, working out and operating a call for proposals system for supporting defence and security related technology and product development, as the part of the plan of measures;
- supporting the international integration of the national defence and security sector by the participation in **international (NATO and EU) defence and security programmes**.

The above measures will create those conditions which are required for Hungary to catch up in the field of security and defence R&D&I, and successfully join the security and defence R&D&I international co-operations.

The draft of the defence and security research and development strategy of the Republic of Hungary was put together in the last quarter of 2005 with my coordination. In August 2008 I handed over the draft of the strategy to the Minister without Portfolio Responsible for Research and Development, who plans to propose it to the government for approval after actualizing it with the Minister of Defence.

In the **forth chapter (The Security research Programme of the European Union)** I introduce the appearance of security R&D in the 6.

Framework Programme of the European Union, then I introduce the **Preparatory Action for Security Research (PASR)**, and the **“Security”** priority within the **7. Framework Programme**. I analyse the Hungarian participation in PASR, as well as in the first call of the FP7 “Security”. **In the first calls of FP7 Hungary was successful only in the “Security”**. Thus *Hungary possesses the human and technical resources of security research*. At the same time, to assure our successful participation in projects of this kind, the National Office for Research and Technology – which is responsible for coordinating the Hungarian participation in FP7 - must work out *measures to provide additional support*.

Beyond the general measures to provide additional support, to enhance our co-operation with nations having developed defence and security industry and research, as well as for policy harmonisation – with countries that can serve as models for Hungary – I have prepared the participation of the National Office for Research and Technology in the **TRANSNASEC** (Transnational Security Research Initiative – Pioneers in the Field of Security Research in the ERA) **ERA-NET** project proposal, to be submitted to the second call of FP7 “Security” priority in the autumn of 2008.

The goal of the **TRANSNASEC ERA-NET** in the second phase – after the policy harmonisation - will be launching a joint call for proposals for the research institutes of the participating nations. The participating nations will contribute to the budget of this call for proposals by allocating budget to support their own researchers, thus creating a so called “virtual common pot”. It means that the “money does not cross borders”. The Research and Technology Innovation Fund can be used for financing such mechanisms, and the National Office for Research and Technology will be expected to allocate 1 million EUR in 2010 for the Hungarian grants of the first pilot joint call for proposals (with the agreement of the Research and Technology Innovation Council).

CONCLUSIONS

The fundamental scientific problem for my research was the appearance of **new**, often **global** scale **threats**, which **require** the **new**, more comprehensive understanding and **definition of security**. The new challenges can be overcome **most efficiently in international co-operation**, within the framework of the various international organisations, institutes and different other international structures. Beginning in 2002 in the NATO Science Programme, then followed by the EU research programmes a new concept emerged: the “security related research and development”, the **“security research”**, which is today one of the most important priorities of the 7th Research Framework Programme of the European Union. The changeable threats and their consequences can be detected and prevented efficiently in time only by **utilising the most state-of-the-art processes, technologies**, the **fundamentals of the security and defence research** and development are the **high technologies**.

The security threats can be overcome only with modern, innovative instruments and processes. The **warfare** has also become **knowledge-based**, requiring various information technologies, precision weapon systems,

protection against attacks of many different types, mobility, and interoperability of the nations. These security and defence capabilities demand research in the field of microelectronics, informatics and communication, material sciences, biotechnology, new energy sources, the achievements of laser and sensor technologies, robotics and space research. It is a growing tendency to produce defence and security systems by using commercially available (off-the-shelf) products, due to the rapid growth of civilian innovation.

Hungary spends less than half of the EU average on R&D&I, and less the one fourth of the leading innovative countries. The structure of financing R&D&I is also undesirable, the contribution of the private sector is approximately half of that of the developed countries. This means that the exploitation part of the innovation chain is weak.

*The political, economic and societal environment of **security and defence R&D&I** in Hungary has changed tremendously since the transformation of the political system. The collapse of the previous political-economic-military alliance, the significant decrease of the domestic orders, loosing the foreign markets, and the restructuring of the ownerships caused a huge drop of the production of the defence industry, leading to its structural crisis in the first half of the '90s. The industrial research laboratories and research institutes providing basis to the security and defence **R&D&I** gradually decreased their activities, most of them were terminated by the middle of the '90s, the well educated, experienced **research and development groups scattered.***

Without a new strategic approach and/ or significant resources we can only preserve the present conditions, in the best case.

The security policy challenges and risks of our era gradually put the emphasis from the traditional military industry onto the security and defence industry, which exceeds the mere manufacturing of military technology devices. Contrary to the home defence related activities, today ensuring the **security of the individuals and of the society, the national security, the industrial security, environmental and health security, food safety, information and transport security mean increasing tasks.** The more and more rapidly multiplying threats and risks connected to the globalisation and the environmental problems caused by the globalisation can be overcome only by a restructured, **multisectoral security and defence industry** based on high technologies, capable to develop and deliver new products.

Transforming the **Hungarian Home Defence Forces** into a professional army, its structural and **technical modernisation** and international participation required numerous capability based plans during the last 15 years. The annual budget based procurement and development programmes instead of guaranteed programme budgets however do not enable the suppliers to create profitable manufacturing, at last leading to higher prices for the devices to be procured. **The financial constrains finally lead to loss-making, unprofitable procurement.**

The potential **breakthrough** for the Hungarian **defence industry** lays in the **interlinking and fusion of the defence and security sectors.** The product development based on the high technologies should be directed not only to the defence and security markets, but also the markets of the **civilian/ dual use products.** When we determine the development priorities, we must count with

the growing potentials and sources of development in the international co-operations (NATO/EU/EDA).

Both on the governmental and the industrial side attentive developments and investments must be realised to support R&D and innovation, **utilising the results of the basic and applied research.**

In Hungary today there is no independent institute that is responsible for security and defence R&D&I, unlike in the NATO and in the EU, thus there is no definite Hungarian partner institution to the **RTA** and **EDA**.

Human capacity coordinating defence and security research has also decreased tremendously, due to the restructurings of the last few years.

The question of financing is not unambiguously solved either: the financial constraints significantly lowered the defence R&D&I expenditures of the MoD. We contribute to the two research co-operation programmes of the EDA, beyond these however we cannot access further financial means to ensure our successful participation in these programmes. **Contribution** to so called “**real common pots**” can be executed only from the **direct budget**, the Research and Technology Innovation Fund does not allow any contribution of this kind (the “money cannot cross borders” principle). At the same time, while we cannot allocate **billions of Hungarian Forints** from the direct budget to **start substantial research and development programmes**, there are two systems in Hungary offering solution for this: one is the call for tenders system of the National Office for Research and Technology, supporting applied research and innovation **from the Research and Technology Innovation Fund**, and the other one is **the Economic Development Operational Programme** for supporting developments close to commercialisation, using **EU structural funds**, managed by the National Development Agency. It would be of great importance to harmonise these financial sources in the field of defence and security R&D&I, since only this could enable Hungary to participate successfully in the entire spectrum of the international programmes.

By that **on national level** we would also ensure **financing the entire cycle of defence and security R&D&I:**

1. *financing basic sciences*: from the direct budget and the Research and Technology Innovation Fund;
2. *financing applied research*: from the Research and Technology Innovation Fund;
3. *technology development*: from the Research and Technology Innovation Fund and from the Economic Development Operational Programme;
4. *demonstration and validation*: from the Economic Development Operational Programme;
5. *technical and manufacturing developments, and research and engineering assistance*: from the direct budget and from the involvement of risk capital and business investment;
6. *operational system development*: from the direct budget, from the Research and Technology Innovation Fund or from the involvement of risk capital and business investment.

In order to reach the **practical applications** from the so called “curiosity driven” **basic research**, through the **defence oriented product development** to the **broad scale civilian commercial utilisation**, besides the excellent

scientists we need **experts** who are **capable to see the potential utilisation** already in the achievements of the basic science, through technology watch, and then are able to **make responsible decisions** based on the continuous **monitoring** of the research and development activities, to decide which developments are worth (further) **financing**.

Dividing the programme financing from the various sources according to which programmes should be financed from the Research and Technology Innovation Fund, and other programmes from the Economic Development Operational Programme demand regular discussions which is carried out on high (ministerial and state secretary) level. I propose that we should allocate a certain amount **from the budget of the MoD**, another amount **from the Research and Technology Innovation Fund and from the EU structural funds** for establishing a dedicated **defence and security R&D&I fund**. We should also provide the **human resource** background necessary for the management and coordination of the defence and security R&D&I programmes. At the beginning a small (3-4 people) coordinating body would be able to carry out the work.

Hungary's societal, economic and national security interests, her accession to NATO and the European Union, and the different geopolitical environment, the global, regional, inner threats, challenges and risks all require the establishment of a dedicated security and defence research and development call for tender system – in compliance with the national as well as the security research and development strategy of the country.

The most important goal of the call for tender system is that Hungary – by the development and exploitation of science and technology - should sustain her international status and strengthen her national security, and effectively contribute to the European security, efficiently realise her tasks deriving from her international security related commitments. Important aim of the call for tenders is the commercial exploitation of the achievements of the security and defence R&D activities.

Analysing the national and international processes it is evident that the profitable and efficient, sustainable background for the security and defence R&D is the high technologies. For this purpose it seems to be necessary to follow the results of the basic sciences and applied research from the security and defence point of view, to support the security and defence related R&D applications, and to harmonise the defence innovation and procurement policy with the knowledge and technological base.

While realising my **research aims** I made all efforts to gain wide range information on the activities of the examined organisations, on one hand from the available – printed and electronic – publications, on the other hand I had access to numerous none-public documents based on my memberships in the various international committees. Again my own national representative activities made it possible and necessary to interview and consult with Hungarian and foreign decision makers as well as decision preparing experts, and analyse compare and synthesize the pieces of information and different opinions.

I have analysed the **Hungarian participation** in the defence research organisations, in the **NATO Research and Technology Organisation**, in the **Western European Armaments Group** and the **European Defence Agency**,

and I have determined those conditions which are required to join the substantial co-operations in the framework of these organisations. I have analysed our participation in the **NATO Science Programme**, as well as **security research programmes of the European Union**, and I have determined the priority directions of our S&T co-operations.

NEW SCIENTIFIC RESULTS

1. By analysing the Hungarian participation in the NATO Research and Technology Organisation, I have determined those conditions which are required for putting the emphasis from our formal participation onto the substantial work.

2. By analysing the experiences of our participation in NATO's science and technology (S&T) co-operations, I have formulated those important parts of the international strategy of the National Office for Research and Technology, which determine Hungary's priority directions for the international S&T co-operation.

3. By analysing the Hungarian opportunities in the activities of the Western European Armaments Group and the European Defence Agency, I have determined those conditions which are required to catch up in international co-operations in the field of the security and defence R&D&I.

4. By analysing the security research programmes of the European Union I have proved that the Hungarian human and technical resources of the security research require a greater scale central support for our participation in these programmes.

PRACTICAL AVAILABILITY OF THE NEW SCIENTIFIC RESULTS

The **new scientific results** of the dissertation can be **practically utilised**:

- for enhancing the number and quality of the Hungarian participation in international security and defence research and development co-operations, especially in the framework of NATO and EU;
- in higher education and PhD courses;
- elaborating applications;
- working out calls for proposals.

RECOMMENDATIONS

The genuineness of the topic and its importance growing permanently requires further research in this field. I propose that further investigations are necessary according to the following criteria:

- **the institutional, legal, financial and human resources background of those countries** – especially the NATO and EU member countries - **which are successful in the security and defence research and international co-operations should be analysed**, the criteria of success should be pointed out;
- the security and defence research and development **capacity and international co-operation of our neighbouring countries** and of those countries which have **similar size to Hungary** should be investigated, as well as their institutional, legal, financial and human resources background.

Budapest, 31. August 2008.

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