

NATIONAL UNIVERSITY OF
PUBLIC SERVICE
Doctoral council

Fábos Róbert engineer major

**The present state and possibilities of development of information
technology systems supporting the planning, organization and
execution of military road cargo transport**

The presentation by the author and official evaluations of the PhD
dissertation of the above title

**Budapest
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Supervisor: Dr. habil. Horváth Attila lieutenant colonel CSc.

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1. Formulating the scientific problem

The Hungarian Army is different from other – civil – business organizations as it has a far wider range of tasks and does not provide “services” or produce “goods” in the commercial sense. Military and defence activities, however, have elements and organisations that are closely connected to civilian life in several ways and areas; they would even lose some of their functionality without it. In other words, civilian and military logistic supply chains have similarities and differences but they have to cooperate in certain areas as the latter relies on the former. Such is military road transport, since the military uses the road transport infrastructure of the country to a considerable extent, but does not take an important and decisive part in building, running or maintaining it. [1]

In my opinion and experience the important notion that military transport operates to a large extent along the same principles and rules as civilian transport has not been adopted widely in the Hungarian Army yet. It is also a tendency that lawmakers make fewer and fewer “concessions” to soldiers. The decrease of exceptions and waivers are justifiable from a road safety point of view since the military uses the same infrastructure and therefore it is not different from civilian users in this respect. However, the fact that military transport has many special requirements non-existent in civilian transport makes it more difficult to recognize the similarities between them. Such a requirement can be the ability to adapt to suddenly changing conditions, travel in convoys, react quickly when the transport task is received, or work in close and effective cooperation with other nations. Without proper professional background and expertise it is difficult to harmonize the civilian and the military approach. The topic would deserve far greater emphasis anyway but in the past years has got out of focus even though in military logistics the “result” of transport is an important element of success.

Competitive civilian transport companies have been using information systems to simplify the organization of transport processes and tasks for decades and these systems also decrease cost considerably. Important civilian carriers adopt new developments in information technology and strive to use state-of-the-art hardware and software. The Hungarian Army is lagging behind, the civilian sector is developing much faster in this and other areas, too. Such an area is the use of IT systems. At present they have only a few IT applications (which cannot be called systems), which these are only partially connected to each other, and are not connected to other systems supporting related areas, such as transport performances, drivers’ workload, records of materials and equipment, etc. Military transport (support of transport) is

a very important basic process of military logistics but it has received little attention in the past years and related research has also been neglected.

2. Research goals and objectives

When I defined the goals of research my starting point was that some properties of military transport units make them similar to a civilian transport company. Although, they perform transport for their own purpose, the units of the Hungarian Army carry out forwarding as well, and also “reserve the right” to perform certain transport activities. One of the aims of my research and dissertation to draw parallels between the civilian and military transport systems, and I attempted to find how the IT systems popular and effective in civilian life can be adapted to the systems currently used in the Hungarian Army. My other aim was to suggest a system platform and define certain points of connection to civilian systems that are necessary and sufficient for the creation of a complex IT system supporting road transport in the Hungarian Army. In order to do this, I have applied systems already used in civilian life. My investigation connects to the work other researchers (Baling Tooth, Bella Refer) at some points but also widens the current approach – my approach incorporates aspects of other disciplines as well.

To perform military transport activities basically all modes of transport (road, air, rail or water) can be used, and the vehicles employed can be civilian or military. The Hungarian Army only has road transport and very few air transport vehicles. Most transport requirements are fulfilled with road transport vehicles, which is quite understandable since other modes of transport also require road transport capacity to carry the goods to and from a ship, train or aircraft, and road transport is also necessary in combined transport tasks. In my opinion the research into transport in Hungary is of utmost importance since the most transport activities of the Hungarian Army involve Hungary or neighbouring countries. I think that first an effective information technology system supporting transport within Hungary should be established, then the IT support of transport activity in areas of operations may be focused on. My opinion is supported by the fact that transport within Hungary is national authority and it is by no means simple to organize, control and monitor it. Transport on an area of operation is however in the context of several nations, which makes research and the creation of a system far more complicated as national information systems have to work together. In light of the above I wish to emphasize that in my dissertation I only concentrated on road transport within Hungary since without it it is not reasonable to start investigating transport in areas of

operation. First the basics of an information system supporting military road transport within Hungary have to be determined as so far this area has not been researched deeply enough and therefore not enough information is available.

3. Research hypotheses

To achieve the research goals I have formulated the research hypotheses below:

- Civilian road cargo transport is largely similar to military road cargo transport also in terms of information requirements and the content of this information.
- The principles of IT systems supporting civilian road transport can be considered identical to those of an IT system applicable in the Hungarian Army.
- The system of indicators used to analyze the performance of road transport can be adapted to military road transport (taking into account the special requirements of military transport) and a properly made information system can support the use of this system effectively.
- Information systems currently used in the Hungarian Army to support road transport can only be considered partial systems since they do not cover the whole transport process from the formulation of the need to the evaluation of performance.

4. Research methods

The research topic I have chosen is widespread and not elaborated (it has been neglected in the past decade), therefore I strove to achieve a complexity of methods. I consider my research applied research, in which both theoretical knowledge and practical experience receive emphasis. Regarding theory I researched, analyzed and used scientific literature published earlier in this field (dissertations, studies, articles and course books). The relevant civilian and military legal background also had to be investigated as without it a transport task cannot be carried out. I experienced the limits of literature research in that there is very little literature available in this area and none from recent years. Research was impeded by the fact that civilian and military legislation is not harmonized everywhere, and military transport is not always sufficiently regulated.

Based on practical experience I considered it necessary to study a wide range of civilian information systems used within an important carrier in Hungary. In this case companies have to be examined which have an up-to-date information system that supports the whole transport process effectively and cooperates with all the internal and external subsystems well. I also considered it necessary to examine the information systems currently used in the Hungarian Army. Another important research method was consultation and interviews with persons whose position and activity is closely related to the planning, organization and execution of military road transport tasks.

My research activity was finished on 27th July, 2013.

5. Summary of research activity

In my research I put the emphasis on finding the ways and possibilities to make the work of military transport organizations and units faster and simpler.

As a first step it was necessary to examine the similarities and differences of civilian and military transport processes. The basis and method of comparison was the detailed examination and evaluation of civilian processes, in the course of which I examined in detail the subtasks that can and have to be performed and compared them to military transport tasks and subtasks taking into account the special activities and circumstances of the Army. The listing of tasks, the examination of their content, and the determination of their sequence or simultaneity of execution form the basis of a modern information system.

After determining the order of the process and sub-processes, it was necessary to examine the principles that have been used in civilian life for a long time to create information systems. I assumed that proven requirements and viewpoints can also be used effectively in the army. As a next step I needed to examine the data the system has to provide to effectively support transport activities and what data the system needs in order to do this.

When formulating recommendations for an information system I had to examine the systems or subsystems currently performing similar functions in the Hungarian Army. The primary goal of this investigation was to reveal what tasks the current systems perform, what tasks they can perform and what tasks they cannot. I consider it desirable to build a system around the applied and proven systems, which can even be integrated into the new system.

My final goal was to determine basic functions and points of connection to civilian systems and recommend the introduction of subsystems already in use in civilian life that can effectively support military road transport.

6. Conclusion

The Hungarian Army differs considerably from a civilian company but in certain areas such as logistics there are processes and activities that can be compared – I have examined and proved it. A very important area of civilian and military logistics is transport. There is no difference between many elements of military and civilian transport and only a little difference between some. After a detailed comparison of the elements of civilian and military transport, I proved that even considering the special requirements of the Army, the elements of civilian transport can be considered as a basis. The methods, processes and models long since used there can be used in the planning, organization and execution of military transport tasks.

When examining the principles and methods of information systems supporting civilian road transport, I determined that they are in accordance with the principles of military transport, i.e. they can also be considered to apply to an information system supporting the road transport activity of the Hungarian Army.

I proved that identical principles and methods should be used to define the necessary input and output data in the information system to be created. Obviously, these data are not important for the whole staff taking part in the transportation process – their place has to be defined in the organization structure horizontally and vertically. In the course of my research I defined the static and dynamic variables that are essential in the various stages (planning, execution, checking) of the transportation process, and also the requirements, principles and relationships concerning these variables and their use.

In addition to the necessary information I examined the information systems supporting road transport currently in use in the Hungarian Army and their usability in actual road transport tasks. I determined that presently there are two information systems (ADAMS and OKKER) used in the Hungarian Army in connection with road cargo transport but neither is able to support transport tasks executed in Hungary effectively. The two systems can only perform certain partial tasks and do not cover the whole logistic (transport) chain, therefore they cannot be considered a unified system. According to this I can state that the Hungarian

Army does not have an information system supporting road transport, not even a subsystem of it.

Based on my research results I determined the main functions essential for the creation of the information system. Such a complex system does not only have to support the whole military logistic chain but also has to be connected to civilian systems since a great deal of information is only available from these systems.

The creation of an information system supporting transport is not an easy task. Numerous factors have to be taken into account in designing it especially if we consider that the Hungarian Army does not have such a system at present. What is essential is that if it is decided that such a system be created, it has to cover the whole spectrum of logistics, that is, not only subsystems should be introduced. Applications designed to perform subtasks (e.g. a route planning system) are often incompatible with each other or ADAMS or OKKER, and often do not provide enough data. ADAMS can and must be considered as a starting point since it has to be used due to our NATO membership. OKKER, unfortunately, does not communicate with it but in itself represents a good basis and direction. It is, however, probably not worth developing when a brand new and far more effective system can be created.

Based on my research, I find it essential that an information system supporting road transport should fulfil the following minimal requirements:

- The database of the system should contain all static data and information that may be necessary at any stage of the transport process (vehicle, material, loading);
- Its map interface should provide all functions that efficiently support the work of the staff during planning and execution and contain all the necessary data of the road network from dirt roads to motorways;
- It should allow the following of vehicles and materials continuously (GPS);
- It should provide unified automatic product identification;
- It should support all elements of the supply chain taking into account the whole organizational structure;
- It should be connected to NATO's information system and cooperate with it easily;
- It should be connected to the necessary systems of civilian life;
- The system should be safe – it should provide adequate defence against hackers and disturbance.

7. New scientific results

The new scientific results of my independent research presented in my dissertation are summarised below:

- 1) Analysing the process of civilian and military transport I showed that military transport is only different due to the special tasks – the principles and methods of transport science can be applied to military transport, too.
- 2) I stated that the basic rules of civilian road transport information systems fully apply to military transport, i.e. they can be used in the creation of an information system supporting the transport activity of the Hungarian Army.
- 3) Based on my research I defined the data and information, the indicators used in the evaluation of transport activity, necessary in an information system supporting military transport and the principles of their application.
- 4) Based on my investigation, I determined the necessary functions and tasks of information systems supporting military transport. I defined the absolutely essential points of connection with other elements within and outside the Hungarian Army, the reason for connection and to some extent the degree of connection.

8. Recommendations

I wrote my dissertation to help the creation of an information system supporting the road transport activities of the Hungarian Army therefore I recommend it to:

- leaders who can ease the daily work of transport professionals with their decisions;
- those working with transport in the Hungarian Army so that they can create a system supporting their work with more insight;
- those non-transport professionals who are in close connection with transport so that transport activities can be organized with a more unified approach;
- officers in bachelor's and master's training in military logistics, or those studying military logistics at lower levels because it can greatly help their studies and future work;
- all researchers who wish to do research into the transport activity of the Hungarian Army in the future.

9. The practical applicability of research results

The research results are expected to be usable and useful in the following areas:

- they can help transport specialists of the Hungarian Army to create an information system supporting road transport;
- they provide help for the future development of the OKKER system;
- they help shape the approach of higher level leaders and decision makers and provide information and support in preparing their decisions concerning transport
- they can be the basis or supplementary material for various professional orders and training materials;
- It can be the basis for further research of the area;
- It can be used in teaching and making teaching materials for bachelor's and master's courses;
- It can facilitate the introduction of a controlling system in the Hungarian Army.

10. Publications made in connection with the research topic

Hungarian language publications

1. Fábos Róbert: Operációkutatás, az elfeledett tudomány a logisztikában – A logisztikai cél elérésének érdekében (Katonai logisztika, XIV. évf. 2. szám, Budapest 2006.; pp. 56 – 70.) ISSN 1588-4228
2. Fábos Róbert: A GPS a katonai szállítások szolgálatában (Bolyai Szemle XVI. évf. 2. szám, Budapest 2007.; pp. 37 – 55.) ISSN1416-1443
3. Fábos Róbert: Katonai szállítások informatikai rendszerének alapjai (Bolyai Szemle XIX. évf. 1. szám, Budapest 2010.; pp. 115 – 122.;) ISSN1416-1443
4. Fábos Róbert: Közlekedési informatikai rendszerek sérülékenysége TÁMOP projekt (Fejezetek a kritikus infrastruktúra védelméből – Kiemelten a közlekedési alrendszer – tanulmánykötet, MHTT, Budapest 2013.; pp. 196-228.) ISBN 978-963-08-6926-3

URL cím: http://mhtt.eu/hadtudomany/KIV_tanulmanykotet.pdf (Utolsó megtekintés: 2013. 10. 10.)

Articles in foreign language publications

1. Fábos, Róbert: Elements Of Procedure Of Shipment And Transit (AARMS 3/9/2010, Budapest 2010.; pp. 115-122.) ISSN 1588-8789
2. Fábos, Róbert: The applicability in military road transport of indicators characteristic to road cargo transport fleets (Hadmérnök VIII. évf. 3. szám, Budapest 2013. szeptember; pp. 50-57.) ISSN 1788-1919
URL cím: http://hadmernok.hu/133_06_fabosr_2.pdf (Utolsó megtekintés: 2013. 10. 10.)
3. Fábos, Róbert: The basis of requesting information in military transportation concerning the goods to be transported (Hadmérnök VIII. évf. 3. szám, 2013. szeptember; pp. 43-49.) ISSN 1788-1919
URL cím: http://hadmernok.hu/133_05_fabosr_1.pdf (Utolsó megtekintés: 2013. 10. 10.)

Hungarian language conference presentation

1. Fábos Róbert: Szemléletváltás a katonai közúti szállítások rendszerében („Katonai logisztika időszerű kérdései” konferencia előadás ZMNE, Budapest 2008.)

11. Curriculum Vitae

Personal Data

Name	Róbert Fábos
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E-mail	fabos.robert@uni-nke.hu
Citizenship	Hungarian
Birth date	1974.08.27.

Professional experience

	2012-today
title	assistant professor
tasks	teaching, research
Name and address of employer	National University of Public Service, Faculty of Military Sciences and Officer Training, Institute of Military Logistics, Department of Military Logistics, Military Transport Group
	2005-2012
title	assistant professor
tasks	teaching, research
Name and address of employer	Zrínyi Miklós University of National Defence, Bolyai János Faculty of Military Technology, Department of Military Logistics, Quality and Transport Engineering, Transport Engineering Group
	2001- 2005
title	lecturer
tasks	teaching, research
Name and address of employer	Zrínyi Miklós University of National Defence, Bolyai János Faculty of Military Technical College, Transport Engineering Department
	2001 Feb.-Oct.
title	transport planner and organizer officer
tasks	planning and organizing water, air and road transport in Hungary and abroad
Name and address of employer	Hungarian Army Military Transport Centre, International Transport Organization Centre
Education	
	2010-today
Qualification	-
Institute providing education/training	National University of Public Service, Military Engineering Doctoral School doctoral candidate
	2006-2010
Qualification	n/a
Institute providing education/training	Zrínyi Miklós University of National Defence, Military Engineering Doctoral School PhD student
	1997-2001
Qualification	transport engineer

Institute providing education/training	Budapest University of Technology and Economy, Faculty of Transportation Engineering, Transportation Engineering 1993-1997
Qualification	vehicle transport officer, transportation engineer
Institute providing education/training	Bolyai János Military Technical College, Transportation, Automobile transport
Skills and competences	
Languages	Hungarian (native) Russian level B2 type “C” (written and oral) English level B1 type “C” (written and oral)
Organizational skills and competences	leadership, organization, service in a unit, educational group leader, curriculum making,
Technical skills and competences	1988-1992 Hungarian Army Armoured and Motor Vehicle Technology Warrant Officer Training Vocational Secondary School, Szabadszállás, motor vehicle mechanic 2004-2005 Training entitled “E-learning material development for public education specialists and teachers”, Szent István University Faculty of Economics and Social Sciences Central Hungarian Regional Distance Learning Centre
Computer skills and competences	Writing, preparing lectures, writing articles and teaching material, using image-editing programs, NEPTUN electronic system administrator level use