AUTHOR'S DESCRIPTION OF A THESIS (PhD)

NATIONAL
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Doctorate Committee

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POLICE MAJOR

Investigating the development and applicability
of a complex decision support system
that improves the intervening ability of firefighters

author's description of a doctorate thesis (PhD) and
its official evaluations

<u>Budapest</u>
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1. THE FORMULATION OF THE SCIENTIFIC PROBLEM

The need for the decision support is as same old as the mankind, since old kings and rulers used dozens of counsellors who helped to make the right decision. Kings and rulers from the History used a dozens of advisers who helped to make the right decision. These philosophers usually proposed to the decision-makers on the basis of their life experiences or their sharpness, or perhaps their exceptional logic, but sometimes of course they occasionally made mistakes.

Even the ancient Greeks used primitive way of the "decision support" since the origins of the Delphi dating site in the Mycenaean age. It goes back to around 1500 B.C. Before the big battles even the rulers and the kings were not ashamed to seek a help in connection with the decision making. Both the advice of the philosophers and the visit to the Delphi fortune, it was a time-consuming and expensive "activity", but the decision makers still trusted in the support. Although the precision of these primitive methods are questionable, the undisputed necessity of decision support is demonstrated.

Nowadays, IT is at a cutting edge, almost everyone has some kind of IT tools. Their use is integrated into our everyday lives, and even our household appliances, televisions and our means of transport are controlled by computer software. We share our everyday experiences, like family events, and often our current thoughts with internet-based websites, using our communication devices. Informatics has been integrated into the work from almost every field of the science, from the medicine to the production technologies, as well as to the fire service and the disaster management.

The development has begun, however, compared to the available options before 2012, there was a huge lagging, which is a kind of waste. Fast, reliable and widely applicable IT technology is available that would be perfectly suited to supporting the firefighters, but the the development is out of date compared to the needs of the industry. At the beginning of my research, the use of computers of the disaster management was almost used for the data-processing. It was rarely used during an intervention.

Computers would allow hundreds of complex operations to be automatically executed by processing the complex databases and mapping the results that could be controlled by state-of-the-art software's based on artificial intelligence technology research. While the aforementioned computers can perform the modelling of logical decisions and results based on predefined protocols and "patterns", in today's case, for a database management software, the decision support system is also used to increase "saleability". It is therefore important to distinguish and limit the decision support systems.

All damages are different, so the information which is needed is built up from other data during an intervention. An up-to-date database is needed on the location and the capacity of the firefighting water sources, and on the roads and bridges conditions. It is essential to have a fast and reliable database management system for the registration of hazardous substances and an active database with the available resources and devices.

My earlier hypotheses included that some of the necessary data could be available from the declarer when a summed, and a complex question group would be available for the call operator. Such complex databases were not yet available in Hungary in 2009.

The transformation of the disaster management has brought some changes in the lead of the firefighting and the remediation system, but the main decisions had to be made by the leader of the firefighting. However, even with accurate data and information, there is a big responsibility to make a good decision. The purpose of the decision-support system is to provide the data which is needed for the decision and to assist in making the right decision.

2. THE OBJECTIVES OF THE RESEARCH

The aim of my research activity - which was started in 2009 - was to investigate the development possibilities offered by the information technology, which I wanted to set up in the firefighters work in order to make the intervention more efficiently and safely. Accordingly, the objectives of my research were set out as the followings:

1. To study and analyse the constraint decision-making mechanism of the leaders of the firefighting, their ability to support and determine and justify their limitations;
2. To study the domestic and the international literature, the research results, the applied technologies and software's, analyse their experiences and find out the contexts;
3. Establish the hypotheses and examine the possibility of demonstrating them;
4. To determine and isolate the decision support systems from the simple database management IT software's;
5. To assess and identify the areas where it is necessary and justified to support the decision-makers, and then to draw on the experience and to reveal the coherence;
6. To perform a trial attempt by producing and running a basic software and finally publishing the results of a suitability research;
7. To formulate the results of the experiences and contexts in the form of proposals and allow them to be used for the IT development of Hungarian disaster management.

Along with demonstrating the hypotheses formulated during the research, I have also examined a wide range of tools and software whose introduction and targeted development can lead to the achievement of the goals outlined above. As part of the research process, I also looked at the question of how and to what extent these developments can be integrated into the already complicated – public body-, firefighting facility and volunteer- fire services - of different operating and economic system.

By studying the relevant literature and the results of the contemporary peers in other sciences, I proved my hypotheses on a theoretical plane, and I also examined the applicability of the research results in practice. During my research I tried to plan the main issues, topics and databases with the recognized experts of the field, which may be a decision-making constraint on the decision-makers of the fire services from the notice to the end of the intervention.

Examining the fire service call centres as well as the technical innovations and the intervention units, I wanted to present a suggestion for the use of the new technologies, and I was planning to investigate it in a team trial by completing a basic software for a complex central IT system called Phoen-X Fantasy.

As a suggestion, I wanted to formulate the experiences I get during the tests, the data that are needed arising during the intervention, as well as the tools and databases that use digital technology to further assist the work of the interferers. I planned to publish the conclusions and some sections of the development in the Hungarian and foreign professional journals and to discuss them at domestic and international conferences and forums.

Looking at the needs of the international cooperation's, I wanted to discuss the partial results together with the experienced researchers and professors, whose results were further discussed.

By preparing the basic software for the decision-support system of the Phoen-X, I wanted to support the research results, which I have been publishing in open forums and specialized journals for launching a discussion.

3. METHODS OF THE RESEARCH

The chosen topic and the complexity of my research objectives necessitate the widespread use of research methods, so I applied the following research methods:

1. I have compiled my own study and research plan to support my academic achievement;
2. I analysed and studied the relevant chapters of the relevant domestic and international literature, the related topics, the relevant publications, studies, manuscripts and the results of the latest researches;
3. I have conducted data collections and analytical searches in web document libraries, databases and libraries;
4. I have worked out and systematized my knowledge during my career as a firefighter, and my experiences in the field of the professional field;
5. I participated in domestic and international scientific forums, studies and conferences, where I have held several lectures, as well as my opportunity to exchange ideas and discuss my research findings with researchers and practitioners of different fields;
6. In the framework of my vocational studies and on my own travels I have collected the knowledge of the experiences of other countries, their current technical backgrounds, the IT tools that are used, the theoretical and practical results of international research;
7. I have conducted proactive consultations with researchers and professionals in connection with my research topic;
8. I consultated with the specialists and lectures of my university and with my vocational firefighter trainers, and as a result we worked together to develop the databases and data groups that is needed to support the interventions in the light of the expected tasks and challenges;
9. By joining the University's TÁMOP's applications, I have actively participated in the university research work on topics related to my field of research. The published scientific results have been published jointly with the teachers, researchers and PhD students of the university;
10. In the course of my research I developed the basic software of the Phoen-X fantasy system, which provided the opportunity to examine the practical applicability of the research results, to prove the experiment and to implement the team trial;
11. I analysed the results of the researches, measurements and tests that I carried out, and deduced new conclusions from my conclusions;
12. I systematized the relevant literature, analysed the results of the contemporary researchers and examined the possibility of integrating them into my work;
13. I presented my conclusions, developments and results- including the completed basic software, in the form of proposals- to the National Directorate General of Disaster Management of the Interior.

The number of the methods I used required that the research process have to be carried out in a well-structured logical order, in order to reach the stated research goals. Different research methods allowed the proven theoretical evidence to be confirmed by practical applicability, so the results could be published and presented as a "tangible" product.

4. THE DESCRIPTION OF THE INVESTIGATED RESEARCH IN EACH CHAPTERS

Chapter 2 – The Decision, The Support and The System in a Traditional and in a Disaster Management Approach

In this chapter, I made a brief overview of the early and current decision support, and then I examined the currently used definitions. Within this I presented the general grouping and types of the decision support systems. After that, I examined the mechanism of the decision making, the closeness of the decision-maker and analysed the decision process, and then I explained the elements of the decision. I have found that the task of decision support is to recognize the possible alternatives in the given environment, analyse their expected results, and elaborate it for the decision-maker.

After that, I defined the concept of the system, in which I analysed and evaluated the sources of literature that the system could be broken down by subsystems and surrounded by an environment that had a direct impact on the system. Next I examined the features of the IT systems, which I separated to the whole and to the independent system.

During examining the complexity, I have found that a complex system can be created whenever the same situation and the change of environment result in the same reaction.

Based on the definitions and the test results presented in this chapter, I considered the basic definition of the decision support system as a software-based, adaptive open computer system consisting of front-end applications supporting databases, modelling layers and visual display of results.

Graphs and the results of the PhD dissertation (2012) of Dr. Ágoston Restas on the firefighters' decision-making process, and its analyses I have determined that in all fields of the decision matrix created for the time available and the future effects can be achieved by using the decision support system, since the total amount of time needed to prepare and take the decision is reduced by the support provided by computers. I outlined the presented thesis on graphs and presented by a concrete example, and then I verified it with measurements. The results of that are described in chapter 6.

The results and definitions in this chapter were treated as a basic definition in the further stages of the study

Chapter 3 - IT systems which are used by the fire service sand the disaster management

In this chapter, I reviewed the IT equipment of the domestic and foreign fire services in point of the assisting and supporting software's during the firefighter's intervention. During my research, I was looking for software and technology solutions that meet the expected criteria, and with their solutions they help to develop a complex system. Given that the whole investigation took a long period of time, IT development has justified me to keep the track of the changes. Therefore, in the first phase of the research I have repeatedly examined the experiences of the research, after the disaster management changes in Hungary, and I also evaluated the new developments and their experiences.

As a result of the investigation, I have found that the Hungarian fire services and the examined European countries are in a same level in the informatics background and in terms of the applied software. There are smaller and bigger software's specifically designed for firefighters, but major innovations only appeared after 2014.

The number of the software developed for firefighters in Hungary was negligible before 2012 and mainly used for statistical purposes. After 2012, the first significant development was the

introduction of the PAJZS and DÖMI system, which are the first decision-making software for domestic operations management.

However, according to my own experiences, the complex decision support system in accordance with the definitions in the previous chapter was not applied to the fire services during the period under review.

Chapter 4 - Preparing the development of the system in the light of the implementation of the planned system

In this chapter, I presented my experiences and achievements in the preparation of the development of the subsystem needed to implement the test and the feasibility of an actual system development process. I examined the process of the development of systems and I answered the general issues that emerged during the development.

On this basis, I have found that mainly the economic factors, then the human resources and the time we need for the development are the most critical factors in the planning of the developments.

I have found that in the work of firefighters, it would be useful in many cases to provide smart phones or tablets and IT devices to support the intervening and the official work as well. I have confirmed my findings and the results of my examinations in line with the research objectives through detailed analyses and test programs.

I have analysed in detail the scope of the applicable IT tools, and I have introduced the introduction of mobile communication tools and the use of smart hours. As a result of the testing of the applicability of the new technology tools, I presented the benefits of computers developed for Raspberry, and the possibilities for introducing the new device. I have found that the introduction of a long-term development strategy and the conscious hardware development, is possible to make a cost-effective buying of the office and location IT tools.

I have presented the results of my research on the correspondence of data protection and security aspects with the development of new technologies, in which I demonstrated that it is possible to create a data protection and a security-protected connection, similar to a closed network, through the open Internet.

I examined the conditions for the development of a nationwide IT system - besides the economic aspects - I proved my hypothesis and made a proposal for the establishment of an internal development team that could be compiled from the IT staff currently employed in the disaster protection staff using the method I developed.

I have introduced Embarcadero RAD Studio, which provides cross-platform software development, which allows to create programs on any operating system and IT device.

I have examined the possibility of making the EDR radio system economical and self-sustaining or expanding into a benefit-producing system, and I have presented my suggestions.

I analysed the legislative background of the application and the provisioning of the IT tools, and I proposed to develop a more efficient application and a support system in order to promote scientific research on fire protection and computer developments.

Chapter 5 – The possibility of developing a decision support system

In this chapter, I presented the process of developing the planned system, and examined the conditions for establishing a nationwide system. To this end, I split the system levels and developed an operational plan.

I have found that for a national system there should be at least three levels in order to ensure nationwide, territorial and location-based operation. I defined the development guidelines and general system requirements. I examined the data protection and data security considerations as well as certain criteria for operational safety.

As a result, I set out the basic conditions of the independent organizational operation, I made proposals for the creation of servers, scheduling of data organization and synchronization.

I have found that national and county servers are needed for stable and fast operation. You may need to download databases and delayed or scheduled syncs for time-consuming disturbances in your network connection or for on-site or offline work.

I have shown that redundancy can be accomplished by standardizing databases, and by creating common databases, it is possible to prevent multiple data processing. I have determined that the bandwidth can be reduced by compressing data packets.

I designed the system for modules and subsystems, tailored to the organizational units and the organization, and then prepared the development process with the team test phase. (Annex 2)

Based on these, I have found that among the modules of the complex system there is a need to create software groups adapted to the organizational elements, for which common databases and the jointing of the results enable a system level operation. As a result of my investigations, I presented the distribution of decision support types for each organizational elements.

I showed that the main groups of the decision-making situations and the related datasets in the intervening activities of the firefighters were adjusted to the probable input and output elements of the decision support modules.

Chapter 6 - Proof of Attempt
The theories I set up and the modules I created for carrying out a demonstration experiment were studied using volunteers in simulated conditions similar to those in a sharp situation. During the first test I measured the efficiency of the completed program modules, so the usability and the time range of measurable measurements during the production or processing of the data, which are the results of the decision cycle. Meanwhile, I have demonstrated with measurements that decision support has a positive impact on decision-making, and the time needed for the decision-making and the decision-making process has been reduced. The decision-making which is based on the decision-making mechanism has a positive impact on the time taken to reach the decision, so some of the elements of the intervention at the scene of the damage will be implemented earlier.

Based on preliminary examinations and analyses, I first calculated the required databases and planned normalization and connection models. The tests carried out on behalf of the Pest County Disaster Management Directorate and then the research development carried out at the fire services of the nuclear power plant made it possible to prepare the pilot software and implement the team trial. The modules described in Chapter 6 and Annex 3 of the dissertation are operational test programs that can be used in sharp intervention, which have been tested at the fire brigade of the nuclear power plant and at several fire brigades of the Pest and Nógrád County Disaster Management Directorates. Attempts to prove the applicability of the system were completed with the official presentation of the results on the 15th of June 2011, after I published the details of the research and presented it to the professional guidance of the National Directorate General for Disaster Management of the Ministry of the Interior. According to the expressed opinions, further researches and developments are expected on the basis of the software and the research results. The first decision-support system development following the establishment of a unified state disaster management organization started in

2013, whereas, according to a proposal published on the website of the National Directorate General for Disaster Management, a further development is expected with the support of a KEHOP project.

In my research, I have demonstrated that mobile communication and IT tools, cheap industrial computers, and desktop or laptop computers are all well suited to operating the software system that makes the decision support system for fire services. Following the modular principles, subsystems, applications and utilities can be created, which can be operable as a stand-alone workstation using a network connection and so-called offline mode. Providing network connectivity to network connections through firewalls and proxy servers providing virtual private network protocols can be accomplished through any Internet connectivity feature, so wireless networking can be a live network connection with compromised devices even if critical infrastructure disruption occurs.

5. CONCLUSIONS

The subject of my research was the examination of the development and applicability of a complex decision support system to improve the interference of the firefighters, which in 2009 was not even a long-term aims in the innovation plans of fire brigades or disaster prevention. The relevance of the topic was substantiated by the rapidly evolving IT tools and requests and inquiries from firefighters. While in the civil sphere and in the field of economic competition, the more targeted development of work-efficiency enhancing software, we could only find a few of the programs that helped to make their work safer and more efficient in the intervening activities of the firefighters. Research on IT opportunities – opposite of the military sciences or other areas of the military engineering - was not characteristic of the environmental science and disaster management disciplines, so the analysis of the literature and the integration of scientific results were also a different task. In addition to demonstrating the theoretical basis, I also set out the objective of examining the practical feasibility of the software, that is, the modules forming the subsystems of the whole system. While designing the sequence of processes and the order in which my research was organized I took the philosophy of Leonardo Da Vinci:

> *"First, you should study the theory,*
> *then comes the practice that comes from it."*

During my work, I went along this philosophical teaching from theory to the practice; I began researching the results of the literature and the results of the contemporary research, then I continued with the examination of the definitions, and ended with experiments demonstrating practical applicability. While formulating my hypotheses, I strived to establish a logical order of knowledge based on each other, for which I produced research and study plans to prove my achievements.

During the analysis of the theoretical bases and the definitions required to prove my hypothesis I examined the historical significance of the decision support, I presented its role and importance. I investigated the new research findings in the field of emergency decision-making of the firefighters - as decision makers - by verifying my hypothesis about the role of the firefighters' decision-making and their eligibility.

I have analysed the computer systems and software, conclusions and experiences applied in the domestic and foreign fire services, and following the principles of the system development process, I examined the conditions for the development of a nationwide size complex fire control decision support system, and designed its modules, databases and operating principles.

I have examined the need of the economic and human resources for a future development, and I have proposed a set of developers to ensure cost-effective and simple implementation of feasibility. I have justified my hypothesis with concrete calculations and with the life cycles of the development process. After the continuous testing of the technical conditions, I have demonstrated the possibility of using new IT hardware, including mobile communication devices and smart clocks, during innovation. I have proposed a modern cross-platform development technology to create a source code for all existing IT systems.

Based on the experiences of the theories and the planning processes, I have proved my hypothesis on the subject of my research in the simulated situations involving the professional and the volunteering firefighters in the research as well and in the simulations of the Paks Nuclear Power Plant fire department and civilian volunteers, I have proved the hypothesis of my research.

6. NEW SCIENTIFIC RESULTS

1. Analysing the lawfulness of the mechanisms of compulsory decision making, I developed the concept of a complex decision-support system that can be applied in the disaster prevention activities by further developing and interpreting the rules and methodological definitions used in the information technology.
2. With the help of measurements and sample programs, I first proved that the activities of firefighters who control the operation management and the activity of the incidents can be assisted a by decision support systems, the use of which also improves the intervention ability of the firefighters, their safety and efficiency.
3. I have analysed and widely explored the possibilities and limitations of the use of the alternative IT devices - industrial computers, phones and tablets - in the disaster response. I have demonstrated the existence of the mobile phones and the use of so-called smart watches by means of a sample program.
4. I have elaborated a technical implementation plan for developments of the disaster management system and, a system development methodology that can be implemented from a low budget and which also provides significant economic benefits over a longer term period.

7. PRACTICAL USE OF THE RESEARCH RESULTS

The theses presented in the dissertation can be used in further researches, forming the basis for developing a complex development policy.

The results of the prepared database plans and modules, as well as the results of the team trial of the basic software, are suitable for use and further development in other fields of the expertise, such as in the disaster management and in the prevention of the military damage.

The results are used to improve the safety and the effectiveness of the interventions.

Using the results of the researches, safety and more efficient IT tools can be developed to help to the firefighters.

The result of the research work, the measurement results and team trial of the elaborated basic software prove that the result of the research can be used in the firefighting and in the technical rescue.

8. RECOMMENDATIONS

1. I propose the development of a nationwide complex decision support system according to the results of my research.
2. I suggest the development of a targeted software for accessing and managing databases or the provision of a SharePoint access on the central servers.
3. I suggest to measure the human resource of the IT graduates and qualification in the disaster management and measure their professional knowledges and programming experiences, and examine the possibility of creating a development team.
4. I am proposing the acquisition of a legitimate Embarcadero RAD Studio for mobile and desktop computers and Linux, Android, Windows and iOS based systems for cross-platform software development.
5. I propose short and long-term development plans for the purchase of new computing devices and the development of targeted software.
6. I suggest to ensure in case of the online software – besides the critical infrastructure protection – to ensure the sustainability of the network failures and the creation of the local databases.
7. I propose the purchase and commissioning of the database servers at the county and national level. All this is needed for the data protection and for the future developments.
8. I suggest to obtain the cheap Raspberry industrial computers for office use and for new workstations.
9. I propose the introduction of the mobile communications devices for firefighters to implement the site-based application and to access the databases.
10. I recommend to the firefighters, to the Disaster Operations Services and to the Disaster Protection Mobile Laboratories to provide broadband Internet connectivity and mobile computing devices to their location.
11. I recommend the purchase of the new safety technology tools and measuring instruments which can connected to an IT system.
12. I propose the purchase of live cameras, which can be used on motor-vehicles, and on helmets. It should be use at the operations management offices in the county levels.
13. I suggest to create workshop or forum workshops or forums, where undergraduate students can get advices from professors and from respected scientist at the area of the law enforcement. So they can get knowledges and can create scientific debates.
14. I propose the develop a wide-ranging research scholarship system and an independent scientific application system.

9. THE PUBLICATION LIST OF THE DOCTORAL STUDENT REGARDING TO THE TOPIC

Proofreaded foreign language professional journals
1. Noskó Zsolt: *Smart devices in the work of firefighters - Kiadása folyamatban -* (2017)

Proofreaded Hungarian journal articles
2. Noskó Zsolt: *Okos eszközök a tűzoltók munkájában – Védelemtudományok Online -* (2017)
3. Noskó Zsolt, Dr. Nagy Lajos: *Tűzoltó-ipari-számítógépek –* In. FLORIAN PRESS 2015:(7) pp. 1-16. (2015)
4. Noskó Zsolt, Komjáthy László: *Android alapú döntéstámogatás a veszélyes áruk szállításával kapcsolatos baleseteknél –* In. BOLYAI SZEMLE 2014:(3) pp. 230-235. (2014)

5. Noskó Zsolt, Komjáthy László: *Riasztási sorrendet meghatározó döntéstámogató rendszerek avagy mesterséges intelligencia a tűzoltók szolgálatában* - In: Komjáthy László, Noskó Zsolt Bolyai Szemle Tematikus Különszám. Budapest: Nemzeti Közszolgálati Egyetem, 2013. pp. 199-208.

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11. Noskó Zsolt: *Zsebből támogatott döntés* - In. KATASZTRÓFAVÉDELEM (ISSN: 1586-2305) LI.: (7) pp. 20-21. (2009)

Not proofreaded foreign language professional journals

12. Schreiner István, Noskó Zsolt: *A Paksi Atomerőmű Tűzoltóságának döntéstámogató- és vezetésirányítási-rendszere* In. MAGYAR VILLAMOS MŰVEK RT KÖZLEMÉNYEI (ISSN: 1216-4992) (eISSN: 1786-674X) XLVlll.: (3-4) pp. 51-55. (2011)

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18. László Komjáthy , Zsolt Noskó , Enikő Kuk, Alexandra Kiss: *Identifikácia nebezpecnych látok pomocou mobilnej aplikácie* In: Karol Balog, Jozef Martinka (szerk.) ADVANCES IN FIRE & SAFETY ENGINEERING. 294 p. Konferencia helye, ideje: Zsolna, Szlovákia, 2014.10.30-2014.10.31. Zsolna: Slovenská technická univerzita v Bratislave, Materiálovotechnologická fakulta so sídlom v Trnave, 2014. pp. 258-261. (ISBN:978-80-88829-80-05)

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22. ZSOLT NOSKÓ, LÁSZLÓ KOMJÁTHY: *POŽIARNA OCHRANA MAĎARSKA – POŽIARNA OCHRANA POHRANIČNÝCH OBLASTÍ* In: Ladislava Simáka, Fanfarova Vrábl'ová Mózer (szerk.) Advances in Fire & Safety Engineering 2013: II. international scientific conference. 220 p. Konferencia helye, ideje: Zsolna, Szlovákia, 2013.10.03-2013.10.04. Zsolna: University of Zilina, 2013. pp. 216-219. (ISBN:978-80-88829-80-5)

Presentation in Hungarian language conference in Hungary

23. Noskó Zsolt: *Tűz és víz: avagy vízpazarlás a tűzoltások során* In: Meddig lesz még Föld Napja? – Doktoranduszok I. Környezettudományi konferenciája. Konferencia helye, ideje: Budapest, Magyarország, 2010.04.17 Budapest: Doktoranduszok Országos Szövetsége, 2010. pp. 18-19. (ISBN:978-963-87569-8-5) Nyelv: Magyar és angol Könyvrészlet/Konferenciaközlemény/Tudományos

24. Noskó Zsolt: *Helyzetértékelés és döntés 2 perc alatt* - Olaj és Vegyipari Tűzoltóságok 5. Nemzetközi Konferenciája. Konferencia helye, ideje: Budapest, Magyarország, 2009.11.17-2009.11.18. Százhalombatta: FER Tűzoltóság és Szolgáltató Kft., 2010. pp. 1-8. (ISBN:978-963-06-8639-6)

25. Noskó Zsolt: *Zsebszámítógépekkel támogatott tűzoltás* In: Dr habil Kiss Zoltán László alezredes, Bicskei Ildikó (szerk.) Intézményi Tudományos Diákköri Konferencia: Rezümé kötet. Konferencia helye, ideje: Budapest, Magyarország, 2008.11.19 Budapest: Zrínyi Miklós Nemzetvédelmi Egyetem, 2008. p. 22. 1 p. (ISBN:978-963-7060-28-1)

26. Noskó Zsolt: *Hétköznapok egy tömegkatasztrófa küszöbén: avagy a társasházak tűzvédelmi problémái* In: Dr habil Kiss Zoltán László alezredes 2007. Őszi Intézményi Tudományos Diákköri Konferencia: Rezümé kötet. Konferencia helye, ideje: Budapest, Magyarország, 2007.11.28 Budapest: Zrínyi Miklós Nemzetvédelmi Egyetem, 2007. p. 62. 1 p.

10. THE PROFESSIONAL – SCIENTIFIC CV OF THE DOCTORAL STUDENT

Date and place of birth: *16th of April 1978. Salgótarján*

Previous workplaces:

1999-2002	*– Fire Department of Salgótarján as a firefighter*
2002-2008	*– Fire Department of Salgótarján, special rapporteur-general on fire prevention*
2008-2010	*– Pest County Disaster Management Directorate, duty manager,*
2010-2011	*– National Directorate General of Disaster Management, duty manager*
2011-2013	*– Nógrád County Disaster Management Directorate, spokesman, Registrar*
2013-2015	*– Nógrád County Police Headquarters, criminal investigator*
2015-2017	*– Nógrád County Police Headquarters, press officer*
2017	*– Nógrád County Police Headquarters, firel rapporteur-general*

Degree:

Gábor Dénes Academy, Computer engineer
National University of Public Service, Defence Administration Manager

Language skills: *English intermediate, Esperanto basic*

Scientific carrier:

2006. ZMNE Student Scientific Circle Budapest – A BM OKF special award
Firefighting supported by pocket computers.
2007. Dr. Balogh Imre competition Budapest, first place
A seal ring for scientific work supporting the professional development of the fire service
2007. ZMNE Student Scientific Circle Budapest first place
Firefighting supported by computers - Development of the firecracker keeping software for news agencies
2007. ZMNE Student Scientific Circle Budapest, third place
Weekdays on the threshold of a mass disaster - Examining the fire protection problems of the middle-level buildings.
2008. ZMNE Student Scientific Circle Budapest, first place
Assisting the firefighters at the event of an accident of the transport of the dangerous goods. (UN-Number program)
2009. XXIX. National Student Scientific Circle Budapest, first place
Assisting the firefighters at the event of an accident of the transport of the dangerous goods. (UN-Number program)
2009. September: Prelim to the Doctoral School of Military Science ZMNE, starting PhD studies.
2012. Dr. Balogh Imre competition Budapest second place
decision-making and leadership in the work of the firefighters 2012-2013. consultancy and research activities
TÁMOP Nr.-4.2.1.B-11/2/KMR, „Research in the critical infrastructure protection"

Thesis evaluation activities:

In 2012 7 theses
In 2014-ben 6 theses
In 2015-ben 5 theses

Supervisor activity at theses:
Csordás László jr.: Investigating the legal regulation of international cooperation and its current issues in the unified system of Disaster Management
Nagy Róbert László: Investigating the applicability of the effective water fog technology in the firefighting of tunnel fires.
Ragályi Gábor: Investigating the applicability of the effective water fog technology in the firefighting of tunnel fires
Győri Balázs: Possibilities of the use of motorcycles in the firefighting.

Budapest, *10th* of *oktober* in *2017.*

Zsolt Noskó police majos
signature