

ABSTRACT

I. Education

In 1990 I graduated Secondary School in Suwałki and I started a master's degree in the Military University of Technology in Electromechanical Faculty. In 1995 I defended thesis and got a master's degree in electromechanical engineering from the scope of the avionics of aircrafts. In 2002, completed Technical Specialists and Logistics of Air Forces and Air Defense Postgraduate Studies in Military University of Technology.

27. September 2004 I defended dissertation entitled „*Selected models of logistic needs of combat aircrafts*” in Technical Institute of Air Forces in Warsaw, written under the direction of prof. Józef ŻUREK and I got the degree of doctor of technical in the discipline-construction and maintenance of engines in the field of logistics

In addition, in 2006 and 2008, I completed the following courses range from obtaining defence products: „*Requirements Generation*”, „*Cost Analysis*”, „*Contract Management*”, „*Life Cycle Cost Management*”, „*Defense Logistics*” oraz „*Emergency Contracting (Rapid Acquisition)*”. Also in 2006, I completed a course in „Logistics in high school”.

II. Information about previous employment in scientific/artistic establishments

Main employment:

- from 14 August 1996 to 31 May 1999 – science and technical engineer in Logistics Institute of Military University of Technology in Warsaw;
- from 01 June 1999 to 30 September 2005 – assistant in Logistics Institute of Military University of Technology in Warsaw;
- from 01 October 2005 to 11 May 2008 – Assistant professor in Logistics, Command and Support Systems of Military University of Technology in Warsaw;
- from 12 May 2008 to 31 August 2012 – Assistant professor in Chair of Logistics, Mechanical Engineering Faculty of Military University of Technology in Warsaw;

- from 01 September 2012 until now – Assistant professor, Chief of Military Logistics Department in Logistics Institute, Logistics Faculty of Military University of Technology in Warsaw.

Additional employment (contract work):

- from 01 October 2006 until now - Assistant professor in Higher School of Logistics and Customs in Warsaw (now the Technical and Commerce University);
- from 01 October 2012 until now - Assistant professor in Cybernetic and Economic European University in Warsaw;
- from 01 October 2013 until now - Assistant professor in The Social Academy of Sciences in Warsaw.

My present professional and scientific career comprises four main stages. The first one is my military service in air squadron, which gave me the opportunity for an active involvement in air operation tasks and an insight into the structure and functioning logistics system combat aircrafts, with its strengths and weaknesses.

The second stage is my teaching activity, which demanded a wider and more scientific approach to problems, how fulfil logistics needs of combat aircrafts. The result of which were both my scientific achievements and the research conducted for my PhD thesis.

The third stage started from the time the designation of me on the Polish representative in the SAS Panel (SAS – *System Analysis and Studies Panel*) which is a part of *Research and Technology Organization* (RTO) NATO. Being a member of the Panel allowed me to look at the wider issue of military security, which is one of its most important areas of research. Thanks to this activity I participate in a number of symposia, meetings of experts or workshops dedicated to the issues of military security.

The fourth stage is starting teaching in courses and postgraduate studies at the Logistics Institute of MUT from acquisition of military equipment area. This was the basis for a deeper interest in the area and its impact on the military security level of the Polish in the 21st century. To emphasize how important scientific and for me this is an area, in the years 2014-2015 I had two internships of Polish and foreign research University - in the Polish Naval Academy in Gdynia on Command and Naval Operations Faculty and at the University of Defence, Brno (Czech Republic).

The issue of military security, including in particular the role it plays in modern military equipment and logistics was always close, as evidenced by the numerous studies, textbooks,

handbooks, monographs, monograph chapters, conference presentations and papers. Apart from my teaching and organizational activities the research which

I conducted has also been used for the following post-doctoral dissertation.

III. Research interests

My post- doctoral work, on which I worked, is a result of my personal interests, as well as years of consultation with a number of Universities, national government institutions, as well as experience and knowledge learned from work in SAS Panek and the publications, which I was the author or co-author. Military security considerations and especially role of acquisition of weapon equipment are especially close to me.

The evolution of my interests these issues addressed in the course of my work, as an employee of scientific and teaching at the Institute of Logistics MUT and a representative of the Polish in the SAS Panel. Participate in the work and scientific symposia such as: *Develop models for intervention support systems*, *Assessment method of weapon system in terms of use of the acquisition system of acquiring military technology*, *Decision support methodologies for acquisition of military equipment (SAS-080)*, *Analytical support to defence transformation (SAS-081)*, *Planning, decision support, system analysis and knowledge development. A technology roadmap*, *Long range forecasting of the security environment (SAS-088)*, as well as directing the thesis: *develop models for the calculation of life-cycle costs of selected military systems*, allowed me to understand the importance of the acquisition system of military equipment in the creation of Polish military security level and see what are the conditions and restrictions on its functioning. For the most important scientific articles, which were the result of my research I include:

1. *The system of acquisition weapons and military equipment*, MUT, Systemy Logistyczne Wojsk No 33/2007, ISSN 1508-5430, pp.251-260.
2. *Introduction to the analysis of life-cycle costs of weapon systems*, Sz. Mitkow, J. Goss, [in:] R. Budzik (edit.), *Production and management in metallurgy*, Politechnika Częstochowska, Częstochowa 2008, ISBN 978-83-7193-378-3, pp.312-317 (own contribution 50%).
3. *Acquisition process of weapon system – challenges and changes*, MUT, Systemy Logistyczne Wojsk No 34/2008, ISSN 1508-5430, pp.59-66.
4. *Procedures for activities related to the choice of weapon system – a discussion article*, Logistyka No 2/2009, CD disc, ISSN 1231-5478.

5. *Logistics in the life cycle of the weapon systems*, Logistyka No 2/2009, CD disc, ISSN 1231-5478.
6. *Logistics in acquisition process of weapon systems*, Logistics Review No 1/2009, ISSN 1898-8202, pp. 4-7.
7. *Logistical problems in the process of technical modernization of the armed forces*, Logistics Review No 2/2009, ISSN 1898-8202, pp.14-19.
8. *The model selection of the fulfilment of the operational capability of weapon system in acquisition process*, MUT, Systemy Logistyczne Wojsk No 35/2009, ISSN 1508-5430, pp.5-16.
9. *Selected decision support methodologies for contract management in the area of national security*, W. Miszalski, Sz. Mitkow, MUT, Modern Management Systems No 4/2009, ISSN 1896-9380, pp.71-84 (own contribution 50%).
10. *Market analysis of the suppliers of weapon system*, MUT, Systemy Logistyczne Wojsk No 36/2010, ISSN 1508-5430, pp.79-88.
11. *On certain methodologies of technology assessment for national security*, W. Miszalski, Sz. Mitkow, WAT, National Security Studies No 1/2011, ISSN 2082-2677, pp.27-50 (own contribution 50%).
12. *An evolution of security environment for armament development planning*, W. Miszalski, Sz. Mitkow, WAT, National Security Studies No 2/2011, ISSN 2082-2677, pp.263-286 (own contribution 50%).
13. *Modern weapons systems and their life cycle*, MUT, Systemy Logistyczne Wojsk nr 37/2011, ISSN 1508-5430, pp.117-138.
14. *Integrated logistics support in acquisition process of weapon systems*, MUT, Systemy Logistyczne Wojsk No 37/2011, ISSN 1508-5430, pp.139-146.
15. *The use of scenario methods in the analysis of environment security system*, MUT, Systemy Logistyczne Wojsk No 38/2012, ISSN 1508-5430, pp.195-210.
16. *Multicriteria selection process of weapon systems vendor*, Gospodarka Materialowa i Logistyka No 5/2013, CD disc, ISSN 1231-2037, pp.384-399.
17. *The role of logistics in the life cycle of the weapon systems*, *Journal of Science of the gen. Tadeusz Kosciuszko* No 3/2013, *Military Academy of Land Forces*, ISSN 1731-8157, pp.122-133.
18. *Quality and security in the life cycle of military equipment* [in:] A. Świdorski (red.), *Problems of standardization, quality and codification in the aspect of integration with*

- NATO and the European Union, quality-problems and solutions*, Part V, MUT, Warsaw 2014, ISBN 978-83-7938-034-3, pp. 277-289.
19. *Innovation in obtaining military equipment and functioning of the security system*, Logistyka No 6/2014, CD disc, ISSN 1231-5478, pp. 909-920.
 20. *Methods for the evaluation of the national security system*, M. Brzeziński, Sz. Mitkow, Logistyka No 6/2014, CD disc, ISSN 1231-5478, pp.484-491 (own contribution 50%).
 21. *National security and the acquisition process of military equipment*, MUT, Systemy Logistyczne Wojsk No 41/2014, ISSN 1508-5430, pp. 221-232.
 22. *Scientific research and the national security*, AMW, Rocznik Bezpieczeństwa Morskiego, Year VIII – 2014, ISSN 1898-3189, pp.213-226.
 23. *The practical use of methods of assessing the national security system*, E. Dębicka, Sz. Mitkow, AMW, Rocznik Bezpieczeństwa Morskiego, Year IX – 2015, ISSN 1898-3189, pp.127-144 (own contribution 50%).
 24. *The concept of the military logistics system modeling of military security system*, E. Dębicka, Sz. Mitkow, Gospodarka Materiałowa i Logistyka No 5/2015, CD disc, ISSN 1231-2037, pp.80-100 (own contribution 50%).
 25. *The use of fuzzy AHP method to evaluation of military equipment in the national security system*, Sz. Mitkow, E. Dębicka, Gospodarka Materiałowa i Logistyka No 5/2015, CD disc, ISSN 1231-2037, pp.538-552 (own contribution 50%).

Included in the listed publications, assessment and analysis led me to continue to research and seek answers to the question, what is the impact on the level of Polish military security has the acquisition system of military equipment? The second important issue, that is the logical consequence of the responses to the first question was the wording of the questions, what should be the changes made in acquisition system of military equipment, in order to increase Polish military security level in the 21st century?

As a result of the above considerations, the hearing was post-doctoral dissertation, whose title is: **Impact of acquisition system of military equipment on the evolution of Polish military security in the 21st century**, and reflects the mainstream of my interests, as well as marks a period of research conducted over the past eight years.

The basic changes in the security environment and in the area of research and technology heavily influenced the approach to organization of the national defence, and thus to acquisition of military equipment.

An important direction of the changes in the national security system is to strengthen the capacity of national defence. This is one of the priority objectives to strengthen the efficiency, effectiveness and coherence of the national security system, possible to achieve through the constant modernization and professionalization of the Armed Forces. This implies the need for continuous upgrading. The right direction is also observed, the consolidation of potential of defence industry and its getting better cooperation with scientific and research potential.

Level of national military ambition requires the maintenance of potential of Polish Armed Forces at a level of quality and quantity necessary for deterrence and ensuring defence credibility. To this level it was possible to achieve one of the main tasks is to equip the armed forces of a modern military equipment along with the prepared support, including logistic support.

To meet today's challenges and threats require that armed forces have the ability to create modular structures, which will have capacity for action in the different environment. The architecture modules should guarantee flexibility and the ability to quickly create groupings of varying nature. On the one hand, they should be able to quickly adapt depending on the evolving needs of the battlefield, with the second to safe and multi-dimensional integration in a larger organizational structure. To make this possible, modular structures should be equipped with modern technology, effective combat and resistant to the threat of cyberspace, automatic and robot-military equipment.

Significant difficulties in achieving Poland's defence capabilities required are stuck in the high cost of modern military equipment and the limited budget of the national armaments industry. These factors result in the need to find alternative ways of developing and acquiring the capability deficit, one of them is the Polish participation in international programs under the aegis of NATO and of the European Defence Agency, such as the *Smart Defense* and *Pooling and Sharing*.

Another essential element of an effective modernization of armed forces is an effective and sustainable system of acquisition, maintenance and remove of military equipment of Polish Armed Forces, to ensure the implementation of the military equipment meeting the operational requirements for the rational management of financial resources.

The introduction of new forms of struggle and modern technique requires the use of other forms of approach to the problem of planning the development of military equipment.

To achieve an appropriate level of interoperability by Polish Armed Forces within the framework of NATO and the EU is a main way to get for Poland allied reliability within the framework of the common security system. The area of national and Allied operational

standardization in support of the training process is one of the essential elements to ensure the achievement and maintenance of by the armed forces assumed level of interoperability and capabilities necessary for joint action in the framework of national operations, multinational and allied.

The Cold War bipolar world represented relatively stable and predictable security environment,. General objectives of armament development planning were clear enough for planners to organize the planning procedures around the main task which consisted in satisfying the needs of future war between two systems. The scenario-based forecasting of security environment limited itself to analyzing possible variants and models of conflict in bipolar world.

The unexpected end of the Cold War has had unexpected effects. The forecasters failed to predict the Cold War's end, the Soviet Union collapse, the Gulf War. Past scenarios have become no useful Bipolar system has turned into a multi- polar system.

In the post - Cold War world not only the “scenarios” seem more complex but the relations between the long-term vision of armament and the objectives of armament development planning are not as clear and “direct” as before. The information on future security environment remains still important for the planners but now they seem more demanding in regards to the question of credibility, accuracy and detail of the results of the forecasting.

They seem also paying much more attention to risk analysis (e.g. to the risk that comes from external armament dependencies, proliferation, from armament market instability and from forecasts inaccuracy), to risk management and related input information as well as to economic limitations and challenges. The end of Cold War also meant the end of a predictable and stable global arms market. In its place emerged a complicated situation, characterized by diffusion of weapons and technology, migration of skilled personnel, appearance of new suppliers and new supply channels, reduced national control over defense industry, advanced-technology weapons in developing countries and in the hands of illegal, transnational organizations. From armament development planning point of view - two decades after the end of Cold War global security environment seems not more predictable than before.

Since antiquity armament has been inherent component of security environment in every historical era. Armament reflected the nature of threats and countermeasures - from Ancient and Classical Periods through Middle Ages and Renaissance to Early Modern and Modern Times. Armament has been often used as the identification mark of given historical era. Development of technology makes the feedback between armament and security

environment and armament stronger. Therefore, it is important to take the right decision in acquisition process of military equipment so as to attain an acceptable level of national security and maintain it. Where possible, the decision-making process should be assisted available methods and scientific tools. Post-doctoral dissertation is next step in this way.

Acquisition process of military equipment has four main stages: identification, analysis and conceptual, implementation and maintenance. The first stage, from defining requirements, provides the basis for further work related to the acquisition of military equipment, as it generates operating requirements defined by the sponsor or organizer of functional system. The requirements relate directly to operational capabilities, to meet the analyzed system. The operational capabilities of the defined user needs and objectives with regard to military equipment and its operation in the expected battlefield environment. The second stage includes the possibility of achieving the defined operational requirements and is supposed to give a response as these capabilities. This way may indicate the answer to the following question: whether to buy new military equipment, upgrade of previously used, is to develop and produce new type? This decision will depend on further investigation and implementation of certain procedures in acquisition process.

The requirements imposed by the process of technical modernization of armed forces have led to interest in the field of acquisition of military equipment. Many countries, including Poland, trying to meet these requirements through changes in organizational and operational structures. These changes are not always the end result should be to meet the needs related to the modernization of armed forces. The formulation of appropriate requirements for military equipment, and consequently their satisfaction requires multiple analyses, which should be:

- current assessment of functioning of armed forces and their military equipment,
- list of needs in terms of organizational and technical solutions,
- assessment of ability to meet operational needs and use of military equipment,
- decisions on the planned activities and their size.

Please note, that the analysis presented reflect the real financial and economic opportunities. The process of modernization is not a short time, its decisions have multi-year effects. Operational analyses, economical, logistical or technical details should provide valuable data necessary for the decision in acquisition process of military equipment. In addition, acquisition process of military equipment was and still is regarded as the domain of the military-industrial complex "isolated" from civilian backgrounds: economic, industrial

and political. Therefore, this work can be an opportunity to another system, look at the process of acquiring military equipment. On the basis of the carried out the identification and analysis of selected stages acquisition of military equipment in Polish Armed Forces will be presented the analytical methods and tools that can assist in the decision making in this area.

An important element on this stage is analysis of parameters characterizing the armament and military equipment. Following characteristics should be the subject of the analysis:

- tactical and technical parameters (e.g. range, mass, speed, etc.);
- logistic parameters (e.g. levels of services, time between services, volumes of supplies connected with the wearing of system components, the number of necessary logistic staff etc.);
- economic and political parameters (e.g. influence on the economy of the country, influence on international conditions, possible industrial cooperation, etc.);
- training (e.g. training periods, accessibility of training bases, certification of specialists, etc.).

In analysis of every of the presented group of characteristics different research methods could be used both qualitative and quantitative. For example to assessment the tactical - technical characteristics we can use the taxonomic method. This method makes possible comparisons of basic characteristics of analyzed armament and military equipment (or group) with expected characteristics (or standards) and on this basis the best armament and military equipment could be defined. The method of experts could be the supplement of the described above method which could confirm the choice of the best solution (but only in the area of tactical - technical characteristics). Further analysis and comparison of technical characteristics for military equipment group can be realized using other methods, such as multicriterial analysis: AHP, Bellingera, PROMETHEE, etc. Using the methods listed, we have the ability to create hierarchy groups of parameters. This allows the rational selection of not only military equipment, but also its suppliers, which will offer the best conditions for the signing of the contract. This is also important in case when the most important parameters are economic and political. Then the decision on the signing and the purchase of military equipment is generally taken by the highest national authorities (the Government, the Parliament). At post-doctoral dissertation is the practical use of Bellingera methods for qualitative assessment of military equipment.

Also in financial and political group has importance of the estimation problem of costs incurred for the acquisition of military equipment, especially when replacing the whole of his generation. Examples of Armed Vehicle Rosomak and combat aircraft F-16 to indicate that it is appropriate to take this theme and the development of such models, which fully reflect the costs of the maintenance of the military equipment of the latest generation. Having such models make it easier to compare solutions and decision-taking, in which direction should we go: the modernization, acquisition or the development and implementation of their own projects.

As a result of dynamics of transformation of Polish defense system and armed forces the need for continuous monitoring and analysis of existing and future threats has appeared. This influences the character of tasks for armed forces. The result of changing tasks of armed forces are changes of capability requirements the fulfillment of which is often identified directly with determined armament and military equipment. Therefore selection of armament and military equipment which should fulfill the given requirements appears frequent problem for decision- makers. Selecting armament and military equipment the decision-maker should take into account among others:

- functions it has to carry out;
- structures in which it has to operate;
- features (parameters) it has to have;
- necessary quantities of particular types of armament and military equipment.

The decision about the choice of military equipment and its suppliers also has a big impact on the functioning of military logistics system. Keep in mind that military equipment is for the most part the objects and technical equipment with specific needs that are necessary for the implementation of the tasks assigned to them. These are often very specific needs without the satisfaction of which equipment can be no useful. The need for military equipment can be divided into operational and logistics. Operational needs are related to the possible variants use of military equipment, and the logistical needs to the provision of opportunities to complete a task by military equipment, as well as the maintenance of it in readiness.

Presented elements affect the decision on acquisition system of military equipment. Knowledge about them and their impact on decisions is a big accomplishment. All this also to influence the level of national security.

Despite the diversity of approaches and positions, research tools and techniques, diversity and specificities of individual users, however, scientific studies, which indicate

clearly the extent to which decisions taken at various stages of sourcing military equipment have an impact on the functioning of the national security level.

The above introduction shows multilevel of the problem and suggests the complexity of the research issues. The awareness of results that **the main subject** has become acquisition system of military equipment in national security system and decision making in this area. The initial analysis of the issues of national security and acquisition of military equipment enabled the author to formulate the following **research problem**, which was presented in the form of a question:

How and why decisions making on acquisition system of military equipment have an impact on the evolution of military security level?

Natural consequence of the wording of the research problem, was working on **specific research problems** included in questions:

1. How to define terms of: security, national security, military security?
2. What tasks are carried out in the area of national military security and how you can evaluate its?
3. What are the main characteristics modernization plans of Polish Armed Forces?
4. What is the role of scientific research, defence industry and logistics in the process of the modernization of military equipment?
5. What factors affect the security environment forecasting the development of military equipment?
6. What is the role of contemporary meets military equipment in the area of national military security?
7. How is the acquisition of military equipment for the national military security system?
8. How should look like identification and decision making model of acquisition system of military equipment for the military security system?

Thematic scope of the above questions became the basis for the determination of the subject: ***Impact of acquisition system of military equipment on the evolution of Polish military security in the 21st century.***

The wording of the specific problems made it possible to generate **a goal**, which was ***the development model of decision making and identification acquisition system of military equipment which will have an impact on the evolution of the level of military security.***

As a logical consequence of the adopted goal was the wording of the following specific goals, including:

1. Definition of security and military security.

2. Identification and characterization of a national security system.
3. Define analysis capabilities and operational requirements.
4. The presentation of the role and tasks of Polish Armed Forces in the area of military security.
5. Presentation of contemporary technical modernization plans Armed Forces and their sources of funding.
6. The presentation of the role of scientific research and the defence industry in modernization process.
7. Showing the role of logistics in the modernization process.
8. Identification and characteristics of modern military equipment and its life cycle.
9. Identification and characterization of the life-cycle cost of military equipment.
10. To determine the quality and innovation of military equipment.
11. Analysis of the main stages in the acquisition process of military equipment for the military security system.
12. Construction model of acquisition system of military equipment for the military security system.
13. Presentation of practical examples of implementation of acquisition military equipment for the Polish Armed Forces.

On the basis of the adopted the main purpose of the work and the specific objectives identified the following research hypothesis, as:

The acquisition system of military equipment and the decisions it made have a significant effect on the evolution of the level of national military security.

On the basis of the following additional working hypothesis assumed:

1. Tasks within the framework of military security are properly defined and implemented and there is a possibility of their assessment on the basis of available quantitative and qualitative methods.
2. The modern military equipment is one of the most important elements which increase the national defensive abilities provides its large international independence and evolution of military security.
3. In the acquisition system of military equipment are specific procedures, which are permanent modifications caused by the emergence of new factors affecting the security environment.
4. There are a lot of conditionalities on the mobilization of military equipment for the military security system, which have an impact on the system.

5. Building efficient and effective acquisition system of military equipment requires the creation of decision-making and mobilization system identification model of military equipment for the military security system.

The review of the adopted research hypothesis has allowed to achieve the goal established for research. Has also become the first step to bridge the gap, which is the lack of comprehensive research and studies concerning the importance of the acquisition process of military equipment in the national security system.

The solution of the problem and verification research undertaken important research hypothesis (and working hypotheses) require the use of the **following methods: analysis** (including analysis and criticism of literature, humanistic analysis-legal, comparative and system analysis methods), **synthesis, generalizations, classifications, modeling, inference and mathematical statistics methods, probability, financial mathematics, strategic analysis, experts methods, as well as multicriterial methods.**

In the course of **analysis and criticism** of the available literature and polish and foreign language and other source materials, has been use to research security, acquisition of military equipment and logistics areas. As a result of the analysis, it was found that the shortage mainly in Polish literature overall shots taken research issues. It can inspire the author to take just such a topic of research.

Analysis of legal institutions used to assess provisions contained in the international law relating to the operation of military security and the rules under which is the process of acquiring military equipment. It has helped to identify constraints that determine the functioning of national security system and the course of acquisition process of military equipment.

System analysis – its application has to specify the desired lines of action in national military security by the diagnosis and consider the options available and compare the predicted their closer and further consequences and effects, especially in acquisition process of military equipment. The analysis allowed also to look at the test area in the holistic way.

Comparative analysis allowed the determination of the differences and similarities between examinees phenomena and processes. It was used at the various stages of the research process. It was possible to review the results of the research and conclusions formulated on the basis of known and similar phenomena and processes.

The **synthesis** was used to generate the conclusions of theoretical and practical research, your experience and the opinion of the experts involved in the acquisition of military equipment.

Classifications used to define sharing and evaluation in areas such as military security, military equipment, life cycle and life cycle costs.

Generalization serve to define universal concepts, constraints and macrosocial determinants under military security and mobilization of military equipment.

The application of **inference and mathematical statistics methods, probability, financial mathematics, strategic analysis, experts methods, as well as multicriterial methods** was necessary to assess the scenarios anticipated risks, estimate the cost of the life cycle and the evaluation and selection of military equipment.

I hope that the proposed solution will contribute to a broader view of the problems in acquisition system of military equipment and to increase its impact on the level of national military security.

The end result of the research process is post-doctoral dissertation, which consists of a list of abbreviations, introduction, five chapters, bibliography, census figures and attachments. The substantive chapters contain arguments proving the thesis as a result of research into the processes and phenomena, and combining them in relationships.

In first chapter, *Methodological basics of the Polish military security*, presents a typology of security in conjunction with national security and national military security. Learn the basics of modeling and evaluation of military security system. The chapter also includes the characteristics of the tasks of the Polish Armed Forces in the field of military security.

In the second chapter, *A review of the current strategy and technical modernisation plans Polish Armed Forces*, shows the problems of defining the capacity and operational requirements, current modernization programs Polish Armed Forces and their funding sources. The chapter also outlines the role of logistics, research and the defence industry on the mobilization of military equipment.

The third chapter, Identification analysis of military equipment in terms of prediction, presents the basic areas and their impact on safety forecasting development of military equipment. Presents definition shot of modern military equipment. Made identification and characterization of the stages of the life cycle of military equipment and its costs. The chapter also includes raising the quality and innovation of military equipment.

In the fourth chapter, *Model of acquisition system of military equipment for the military security system*, provides a mathematical model of the acquisition system of military equipment made up of identification model and decision making. The modeling process consist of two stages: conceptual model building and identification, respectively, for his

model-based decision making. Also shows the general approach to the formal modeling of the system of praxeological, which is the acquisition system of military equipment. The chapter also contains practical examples of simulation studies of selected model elements.

The fifth chapter, *Examples of the implementation of the model-based solutions to acquisition of military equipment in terms of military security*, presents practical implementation model of acquisition system of military equipment in the Armed Forces, Air Force and Polish Navy. Also shows two implementation for military equipment for all services Polish Armed Forces.

Post-doctoral dissertation closes **summary** containing the essential conclusions on the basis of the carried out research process.

Research presented in post-doctoral dissertation on the problems of acquisition system of military equipment and its impact on the level of Polish military security are many roads of interests of the author. One of them is 10 years active in the SAS Panel (System Analysis and Studies) belonging to STO NATO (Science and Technology Organization). Another is teaching college courses and workshops from the mobilization of military equipment, which became a very good source of knowledge and the plane of the verification of their own views. In this way, the knowledge gained, although not fully, was presented in the individual chapters of the dissertation. I hope that the presented here problems and proposals for their solution, although in a small way help to improve the functioning of acquisition system of military equipment, and thus it will have an impact on the Polish military security in the 21st century.

It should be noted that developed on the work post-doctoral dissertation applies to areas where particularly spent a lot of space in my existing scientific work, as Assistant Professor of higher education, which gave me specific arguments and energy-generating equipment in the necessary knowledge to scientific assessments and analysis support the empirical data. Subject of my publications and participation in national and international conferences refers largely to the, which I took at post-doctoral dissertation.

IV. Other achievements

Since I obtained PhD degree in 2004 I have been the author or co-author of 70 scientific papers published in national or international periodicals and monographs (listed in Appendix). I have participated in two grant research projects funded by the State Committee for Scientific Research and The National Centre for Research and Development and one research analytical project. I have also been the project manager of two statutory research and one of Rector

research and one of Dean research. I have been the speaker at several national and international conferences, symposiums and workshops.

Teaching activity

Academic teaching constitutes a significant part of my work. Until now I have given over 5000 hours of lectures and classes for the students of the Military University of Technology, Higher School of Logistics and Customs in Warsaw (now the Technical and Commerce University), Cybernetic and Economic European University and Social Academy of Sciences in Warsaw where I have supervised 55 master's degree students, 42 engineer's degree, 30 bachelor's degree and 15 post graduate students in total. Currently I am conducting seminars for 10 undergraduate students and 5 graduate students.

During my previous teaching activities in the Warsaw Colleges and Universities, I led lectures of different subjects:

- Basic logistics;
- Quantitative methods in logistics;
- Logistics technical equipment;
- International logistics network;
- Logistics management;
- Acquisition of weapon and military equipment;
- Military logistics;
- Logistics systems;
- NATO Logistics.

Since 2005 until now I am lectures in English on course „Standardization within NATO” organized by the MUT and NSA (NATO Standardization Agency). Leading lectures and exercises on qualifying courses and workshops for servicemen carried out by the Institute of logistics at Military University of Technology.

I have dealt with and I also review thesis (master's degree, engineering and undergraduate). A total of review thesis are over 40. From 2014 I am a member of the Council of the Logistics Faculty.

Internships in Polish and foreign scientific centers and academic

In the years 2014-2015 I had two internships. The first half-yearly, in the Polish Naval Academy in Gdynia on Command and Naval Operations Faculty. During this internship deepen your knowledge in the area of security, national and military security.

Second, took place at the University of Defence, Brno (Czech Republic), where on Faculty of Military Leadership, I have read the issues of military security, defense planning and programming and technical upgrading in the Armed Forces of the Czech Republic.

National and international organizational activity

Since 2005 I am a Polish representative in the SAS Panel belonging to the STO NATO (formerly RTO). Within the framework of the activities of the Panel I attended:

- in 18 business meeting,
- in symposium *Decision support methodologies for acquisition of military equipment* – Brussels 22-23 October 2009 – as a speaker of subject: *On certain acquisition procedures of armament and military equipment*,
- in symposium *Analytical support to defence transformation* – Sofia 26-28 April 2010 – as a speaker of subject: *Analytical methods supporting defence acquisitions*,
- in workshops *Planning, decision support, system analysis and knowledge development. A technology roadmap* – Brdo (Slovenia) 25-26 October 2010,
- in workshops *Long range forecasting of the security environment* – Stockholm 11-12 April 2011 – as a speaker of subject: *Long range forecasting of security environment for armament development planning*,

In the years 2006-2008 I was the organizer and supervisor of the 5 courses conducted by the Logistics Institute (Chair of Logistics) and Naval Postgraduate School (NPS) from Monterey (California USA) – *Defence Acquisition Planning* – April 2006, *Defence Acquisition Planning* – February 2007, *Life Cycle Cost Management* – February 2008, *Defence Logistics* – April 2008, *Emergency Contracting (Rapid Acquisition)* – September 2008.

In the framework of the IDARM Group (International Defence Acquisition Resource Management Program) organized by the Naval Postgraduate School (Monterey, California) I was involved in a series of lectures in Kiev (Ukraine) - September 2006, during which I presented 4 presentations regarding changes in the acquisition system of military equipment – Polish experiences.

In the years 2005-2008 I participated in College Editorial „Academic Voice” MUT, where I posted 2 articles and 3 papers about of Logistics Institute activities.

In 2005-2007 and 2011-2013 I was scientific editor (30/2005 31/2006, 32/2006, 33/2007; 36/37, 38//2012, 2013), and since 2014 I'm a theme editor of Scientific Notebook „Systemy Logistyczne Wojsk” published in the Military University of Technology.

I was a co-author of the study programs and plans for military and civilian training in logistics, and for their implementation and the accreditation of the National Accreditation Commission in 2009 received the prize of the Rector of Military University of Technology. In the years 2012-2015 I was co-author of the programs and plans of qualifying courses for the degree full time: Lieutenant, Captain and Lieutenant Colonel in support area and Logistics Support Course conducted by the Logistics Institute.

In the years 2006-2009 I was science secretary and organizer of Scientific Conference of applied Logistics „*Complementarity of civil military logistics*” (the list in the annex).

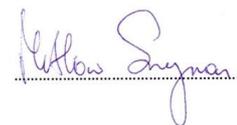
In the years 2008-2010, I was a member of the Commission of the Senate of the Military University of Technology.

I would like to emphasize that my scientific and teaching activity is devoted to the area of social science, namely security studies. The research conducted was mostly related to Polish military security.

In the course of my 25 years of military service I have achieved my superiors' recognition which resulted in subsequent promotions and distinctions. In 2009 I received the title of the meritorious Teacher of academic achievement in educational work for special scientific and educational.

In 2014 my military activity has been crowned receiving Golden badges of honor Soldier of the Republic of Poland.

My military awards and decorations include Bronze Cross of Merit, Bronze Medal of National Service, Bronze, Silver and Gold Medal of Merit for National Defense, Armed Forces Bronze and Silver Medal of Merit for National Service.



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