

**ARMED FORCES ACADEMY  
OF GENERAL MILAN RASTISLAV ŠTEFÁNIK**



**ABSTRACTS  
STUDENTS SCIENTIFIC CONFERENCE**

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# CONTENTS

## MECHANICAL ENGINEERING

<b>Samuel FILÍPEK</b> Contemporary trends in thermal camouflaging .....	5
<b>Peter HALGAŠ</b> Introduction to measuring the impact of an explosion in mobile machinery personnel.....	6
<b>Peter KALNA</b> Utilization of vibration analysis for praxis .....	7

## ECONOMICS AND LOGISTICS

<b>Lukáš GNIP</b> Analysis of employment in eastern Slovakia region .....	9
<b>Marek HRAŇO</b> Nature Protection in the Military Zone .....	10
<b>Peter MAČOR</b> Possible approaches to reducing energy AOS dependence on external suppliers .....	11
<b>Lenka RANDIAKOVÁ</b> Science and research's support from Structural funds for AFSR needs .....	12
<b>Katarína ŽULKOVICHOVÁ</b> Possibilities of solution outsourcing and e-commerce at equipment-service at armed forces .....	14

## ELECTRONICAL ENGINEERING AND INFORMATICS

<b>Branislav BUMBÁL</b> Security device with alarm transmission to a GSM network .....	17
<b>Matej DEVEČKA</b> Measurement of emissivity of solid materials with millimeter band radiometer .....	18
<b>Matúš GAVAJ</b> Signal processing of millimeter wave radiometer .....	19
<b>Miroslav PACEK</b> Model of a system for evaluating energetic conditions in the VHF band for radio communication .....	20
<b>Marek POVAŽAN</b> Measurement of antenna parameters .....	21
<b>Marek ŠURKA</b> Realization of application logic of database application .....	22

## MANAGEMENT

<b>Renáta BARCÍKOVÁ</b> The exploitation of orienteering running for development of professional soldiers .....	24
<b>Karina KONDRÁTOVÁ</b> Effective communication as a basic work in the military manager .....	25

<b>Jana KUBÍKOVÁ</b>	
Public relations in Armed forces of Slovak republic .....	26
<b>Monika KUČIAKOVÁ</b>	
Evaluation of operations of international crisis management.....	27
<b>Gabriela MESÁROŠOVÁ</b>	
Game theory and its applications in military decision-making .....	28
<b>Mária PJATEKOVÁ</b>	
Civil-Military Co-operation (CIMIC).....	29
<b>Ivana PRIHODOVÁ</b>	
Specific forms of communication military manager .....	31
<b>Ján SKALICKÝ</b>	
Effective management and administration of realites, plants and devices – facility management and possibilities of realisation.....	33
<b>Ľubica ŠTOFANOVÁ</b>	
Science methods for decision support .....	34
<b>Lenka ZVALOVÁ</b>	
System of motivation and remuneration in organizations such as an essential factor of employees' activity .....	35

# **MECHANICAL ENGINEERING**

## CONTEMPORARY TRENDS IN THERMAL CAMOUFLAGING

Samuel FILÍPEK

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The goal of this paper is to consider the contemporary state of camouflaging the military vehicles in the infrared spectrum in the different world's locations, to compare the camouflaging devices developed by the Armed Forces of Slovak Republic with the other one's that were designed all over the world. In the last part of this paper is some new concept of new camouflaging thermal shield introduced.

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# INTRODUCTION TO MEASURING THE IMPACT OF AN EXPLOSION IN MOBILE MACHINERY PERSONNEL

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The paper presents and describes the modern knowledge of measuring the effects of explosions on live power of mobile machinery. These measurements are then used when assessing the ability of the vehicle to protect its crew. It outlines situation in the world, which leads to the need to be concerned with this issue and is characterized by increased usage in improvised explosive devices. In this paper, in the center of the attention is the design of APC, as assessed mobile machinery, focusing on the deployment of crew and elements of protection in respect of exposure to explosion. Divides and describes direct or indirect negative effects of explosion that affect the live power of the vehicle. Attention is devoted to a particular use of special measuring devices and their interaction to achieve the most accurate description of actions following the initiation of an explosive device. The dominant part of the paper discusses ways of measuring physical parameters acting on the body member of the crew, offering methods of evaluation, define the limits and then assign possible injuries. In conclusion there are suggestions offered to technical improvement of vehicles that contribute to reducing the possibility of injury to personnel.

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## UTILIZATION OF VIBRATION ANALYSIS FOR PRAXIS

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Paper is treat about resources of vibration in mobile technics. Vibration analysis is one of the basic assumptions of operational reliability, safty and economy of operation of automobiles. Vibration analysis as the main analysis signal uses vibrations, agitation and noise. The frequency analysis removes the disadvantages of an analysis in time domain; it detects diseases of several part of an object (unbalance, gear trains, lodes, etc.). Monitoring of a working state of machinery and finding their diseases in initial stage founded on exact analysis of mentioned signals is too much difficult and expensive for everyday use. Based on the monitoring and analysis of these spectra changes it is possible to efficiently diagnose, detect, identify and localize eventually prognose emergent failure without disassembly. Monitoring of working state of machinery and finding their diseases in initial stage founded on exact analysis of mentioned signals is too much difficult and expensive for everyday use. Therefore is needed to use method which makes possible to discovery most of diseases in time, inhibits wrong result the most effectual, is simply enough and does not put a strange demands on the qualification of users, provides enough amount of an information to find the symptoms of diseases and for decision about next step, i.e. about execution exact analysis.

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# **ECONOMICS AND LOGISTICS**



## ANALYSIS OF EMPLOYMENT IN EASTERN SLOVAKIA REGION

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Work solves in three chapters live social-economical problem of actual Slovakia. First of all in Eastern Slovakia region is stage of unemployment, very critical. It has economical and social aspects, therefore it is necessary to analyze the real situation and realize adequate measures to make the situation better. To this achieve this goal should tend this work, that's main target is to, analyze current stage in Snina a Humenné districts and suggest, which one of the realized measures is the most effective, eventually which measures are necessary, to solve this problem as fast as possible.

My work is divided into three chapters. The first one represents theoretical entrance to the problem, where at 10 pages is unemployment characterized in generally and trend of unemployment in Slovakia. In the second chapter there's the labour market analyzed in chosen region from available data provided by the unemployment bureau in Humenné. The fact is that the unemployment rate has risen in last few months because of the world economical crisis. That brings problems which cause problems in family life, small and medium bussiness enterprise. The big part of qualified labour power leaves the region in order to work in richier regions or abroad. That makes the situation in the region even more complicated. As these people come back because of the world economical crisis, the unemployment rate is rising. The third chapter is the major chapter, because it analyse the options of the solution of the problem. The labour market policy in districts of Humenné and Snina is there confrotated with achieved results. And that leads us to the fact that some elements of this policy miss the effects. In conclusion the government has to put more effort to solve the problems in regions like this.

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## THE NATURE PROTECTION IN THE MILITARY ZONE

Marek HRAŇO

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Armed Forces Academy of General Milan Rastislav Štefánik

This work focuses on protection of the environment because the nature is nowadays very often disturbed and destroyed. The areas used in our region for military trainings hides significant part of animal and plant species. These area is for military purposes partially isolated and all activities are there strictly limited. Thank to this special conditions was there created a very unique biotop. The aim of my work is to show the importance of protection of the environment in these isolated areas. Zahorie Military Training Area was added to the network of protected areas of European importance Natura 2000. There are implementing two projects „Restoration and Management of Sands Dunes Habitats“ and „Restoration of wetlands of Zahorie lowland“, which are implemented with the financial contribution of the LIFE financial instrument for the European Community. Local diversity of species is unique in Slovakia and in others states of European union.

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## **POSSIBLE APPROACHES TO REDUCING ENERGY AOS DEPENDENCE ON EXTERNAL SUPPLIERS**

**Peter MAČOR**

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Armed Forces Academy of General Milan Rastislav Štefánik

The Academy needs more and more money for energy expenses, so we decided to highlight the prospects for the use of advanced energy technologies in terms of AOS. The aim is to show potential solution to minimize the amount of financial input into the energy to explain how it could work. It is known that conventional energy resources are scarce, environmentally unacceptable, and those reasons are more expensive and more expensive. If conventional energy sources are still less, or their production base is expensive and prices are rising, consumption is growing at an ever decreasing budget for the operation of the various entities connected to the state budget. This is also the current issue of the Academy, so in addition to passive measures to reduce energy intensity, and should take active solutions are focused on renewable energy sources, namely the use of solar, water, air heating, hot water by using available technologies, such as heat pumps, solar collectors or photovoltaic cells. Therefore, coming up with possible suggestions about how these renewable sources can be used in terms of the academy. Work will focus on knowledge technologies and their application to the College terms, experience has already implemented solutions and what we offer the perspective of these technologies. The work will focus mainly on the use of heat pump technology, as they are highly effective and the investment return is guaranteed. There will be mentioned what is heat pump, how it work and how we can use it in academy conditions. In fact we will learn how can we use solar energy, which is saved by earth, ground water and land in warm seasons, and how this available energy is consumed in cold seasons. We will learn what we need to know, if we are going to install a heat pump, what influence it has for environment and many other properties of heat pump. I couldn't forget to mention strongnesses and weaknesses of whole project, if it will be realized sometimes in the future. I try to outline possible opportunities other usages of solar energy in fourth part. It's mainly about using direct and indirect solar energy, not only through heat pump. There is my point of view in this work and I hope it will be useful.

## SCIENCE AND RESEARCH'S SUPPORT FROM STRUCTURAL FUNDS FOR AFSR NEEDS

Lenka RANDIAKOVÁ

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Topic of this work is science and research's support from Structural funds, their forms and concepts. In the introduction of this work is described characteristic of Structural funds, their history, not only in the Slovak republic, but also in the European communities. I was devoted Structural funds, which are used nowadays in Slovak republic, in next parts. In the clause of my work I characterised Operational programme Science and research, which is organised by Ministry of Education of Slovak republic. I characterised also methodology of mailing postulatios for non-repayable financial contribution concretly for Operational programme Science and research. In the las chapter I adduce proposal of drawing from European rural and developmemt fund.

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# POSSIBILITIES OF SOLUTION OUTSOURCING AND E-COMMERCE AT EQUIPMENT-SERVICE AT ARMED FORCES

**Katarína ŽULKOVIČOVÁ**

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By outsourcing, public sector institution can provide activities that can not because of cost or quality to perform effectively, and therefore provides a means of third parties. Experience shows that globalization and outsourcing are closely linked. The successful implementation of outsourcing in the public sector, and thus even the armed forces is very difficult. In the military surroundings operates a number of external and internal factors that hinder its successful implementation. Currently beginning to show trends of outsourcing as a management tool of efficiency and economy also in conditions at defense of the Slovak Republic.

Paced work addresses contemporary issues, which has equipment assing, what is its current status and possible future development. It examines how to create the conditions for effective functioning of the equipment service, taking into consideration two major factors in the implementation outsourcing to the equipment service, namely: quality and costly.

In the work we compare the advantages and disadvantages of implementation outsourcing at equipment service. the possible risks, possible use of electronic commerce in equipment service , to be more efficient so that to improve and expand their services to be more reliable, faster, in short more flexible and would reduce the number of personnel participating in the system.

In this work we will seek answers which can be large savings in the long run and how they can be measured and whether the savings outsourcing can undermine the readiness of the armed forces and their combat potential.

The use of e-commerce in the future, would mean an increase of comfort and services of professional soldiers to improve their focus to perform her duties. Other effects would have meant a possible reduction in the number of service personnel, a reduction in inventories, ensuring greater transparency in financial resources spent, that is, the consequent reduction in operating costs. The armed forces should respond flexibly to new opportunities offered by current technology and timely to response to changes in market surrounding.

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# **ELECTRONICAL ENGINEERING AND INFORMATICS**



# SECURITY DEVICE WITH ALARM TRANSMISSION TO A GSM NETWORK

**Branislav BUMBÁL**

Consultant: doc. Ing. Ľubomír Andráš, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

The aim of this work is to design and construct reliable security device with alarm transmission to a GSM network. In the introduction deals with the choice of microprocessor, AT commands. Then i describe the parameters of the device, functions and finally layout of circuit board. The device can be used as a security device (house, car, cottage) or as a remote control device to control any other device (restart routers, boiler control).

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# MEASUREMENT OF EMISSIVITY OF SOLID MATERIALS WITH MILIMETER BAND RADIOMETER

Matej DEVEČKA

Consultant: Ing. Mikuláš Šostronek, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

Work concerns on measurement emissivity of solid materials with millimeter wave radiometer. Main objective was to create algorithm in Matlab GUI language for effective value measurement from radiometer and thereafter handle them in the form that represents samples emissivity. Work also contains solution for enhance range of values on A/D converter card, by reason of better computing and decrease errors. Work consists of two parts. Theoretical, describing a developed algorithm, graphic user interface and amplifier circuit. And practical, which utilizes mentioned algorithm and enhance circuit for practical measurement of office paper emissivity.

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## SIGNAL PROCESSING OF MILLIMETER WAVE RADIOMETER

**Matúš GAVAJ**

Consultant: Ing. Mikuláš Šostronek, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

This work aims to clarify the general question of Radiometry, whose significance lies in the measurement of radiation in any part of the electromagnetic spectrum. An attention is given to the analysis of different types of radiometry used in various technical fields.

A part of the work is a program that is used for signal processing of millimeter wave radiometer. The results of measurements are possible to display graphically.

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# MODEL OF A SYSTEM FOR EVALUATING ENERGETIC CONDITIONS IN THE VHF BAND FOR RADIO COMMUNICATION

Miroslav PACEK

Consultant: doc. Ing. Zdeněk Matoušek, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

Without providing successfully build connections between different levels of troops, it is not possible at present days to carry out successful combat operations. Establishing connections using radio stations in the main rate at the tactical level is significant, especially for VHF frequency band. Knowledge of the various parameters of radio stations, their method of operation, and the energetic situation, provides the basis for successfully establishment of connection.

The theme of my work is to provide a fuller perspective on the issue of power relationships in a radio communication chain. I have implemented the description of individual relations to solve the problem to GUI programming tool MATLAB. This tool provides the simple and easily understandable view on the issue of power relationships, in order to create successful radio connection.

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## MEASUREMENT OF ANTENNA PARAMETERS

Marek POVAŽAN

Consultant: Ing. Mikuláš Šostronek, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

Currently, antennas are used in almost every area of mankind's activity. They are applied in the civilian sector, as well as in military applications. They are used to transmit information across open space in the form of electromagnetic waves. Their basic parameters determine the quality of information processed in electronic devices and also the distance at which the antenna is able to accept (detect) signals. The most important parameters of antennas are particularly gain and amplitude of the directional characteristic in the horizontal and vertical plane. Horn antennas of all kinds are most commonly used throughout military applications. This scientific work deals with the problem of measuring the gain of the basic types of horn antennas. The first part deals with the theoretical base to the basic types of horn antennas and it describes the most common methods of measuring the gain of antennas. In the practical part there are three measurements elaborated, which are focused on the measuring of the frequency and performance of a high-frequency signal generator, gain measurements of horn antennas using the method of two identical antennas and the comparison method. An auxiliary program is included with the practical measurements, which calculates the basic parameters of horn antennas and enables the calculation of the gain of horn antennas after entering the measured performance.

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## REALIZATION OF APPLICATION LOGIC OF DATABASE APPLICATION

Marek ŠURKA

Consultant: Ing. Ľubomír Semančík, PhD.

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Computer technology and software accessories are one of the most important part of management systems and takes part in decision - taking of manager. Nowadays the inseparable fact is to take heed to make data safe. It means to choose the best and the safest way how to manipulate with data, mainly to enhance emphasis on transport and process of saving data. These are the reasons which answers the questions why is still needed to search new methods in manipulation with data.

The theme of my scientific work is to describe possibilities of data processing by means of the database systems [2, 4]. The main part of my work is concentrated in pointing to various architecture of data processing in computer technologies and also the concrete software facilities which are needed for realization of application logic of database application e.g. stored procedure, extended stored procedure and instructions and functions of programming languages [1, 3, 4].

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# **MANAGEMENT**

# THE EXPLOITATION OF ORIENTEERING RUNNING FOR DEVELOPMENT OF PROFESSIONAL SOLDIERS

**Renáta BARCÍKOVÁ**

Consultant: Mgr. Dušan Litva, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

The aim of this work is to emphasise the potential use of orienteering during the topographic preparation of professional soldiers of the Armed Forces of the Slovak Republic.

Military topography is a part of the preparation of all types of ground troops without distinction of specialization. Working with a map belongs to the basic skills of all professional soldiers. In the Armed Forces of the Slovak Republic is a military topography mainly based on theory and many professional soldiers do not have enough real exercises with a compass and a map in unfamiliar terrain.

Orienteering is a sport that combines physical and mental effort. Orienteering skills as well as physical abilities are used for looking for control points in unfamiliar terrain. Especially important is endurance which is necessary for exercises in demanding terrain.

During the preparation of professional soldiers in many European countries is orienteering used as a tool for the development of topographical skills in combination with physical training. The introduction of orienteering into the preparation of professional soldiers would bring many advantages. The main benefit would be the development of military topography of all the soldiers of the Armed Forces of the Slovak Republic.

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## **EFFECTIVE COMMUNICATION AS A BASIC WORK IN THE MILITARY MANAGER**

**Karina KONDRÁTOVÁ**

Consultant: doc. PhDr. Mária Petrufová, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

The aim of this work is to rise up communication as a basic skill of 21st century manager. Also to point out the importance of effective communication in a work of military manager (commander), try to increase word efficiency of their subordinates, students (cadets) and to motivate them for their future duties. The part of the contribution is also the practical site from which I came to conclusion that there is more average and even low level of effective communication.

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## PUBLIC RELATIONS IN THE ARMED FORCES OF SLOVAK REPUBLIC

Jana KUBÍKOVÁ

Consultant: doc. PhDr. Mária PETRUFOVÁ, PhD.

Academy of the Armed Forces of General Milan Rastislav Štefánik

Public relations in The Armed Forces of Slovak republic... In my work We solve the problem of public relations. We also focused our attention to the meaning the function and goals of PR by adepts about enter to OSSR. Also We discovered system of informing with public about OSSR. We made conclusions about well or not well work with public and pleasure of cadets by enter to OSSR and also their motivation in the past and future time . By the means of survey we found out how PR can improve chances in the enviroment of OS SR.

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## **EVALUATION OF OPERATIONS OF INTERNATIONAL CRISIS MANAGEMENT**

**Monika KUČIAKOVÁ**

Consultant: prof. Ing. Milan Sopóci, PhD.

The aim of my work is to inform readers about the issue which is focused on foreign operations and slovak soldiers acting there. I hope that on basis of acquired information the reader will be able to create the whole picture of acting the members of armed forces at these operations.

# **GAME THEORY AND ITS APPLICATIONS IN THE MILITARY DECISION- MAKING**

**Gabriela MESÁROŠOVÁ**

Consultant: Ing. Ondrej Kredatus, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

This thesis discusses about game theory, the main task is the processing of general knowledge of game theory. The work is the application of theoretical knowledge to solve challenges in military decision-making. The first chapter is the introduction to the problems and generally describes the theory of games, its classification and basic concepts. The aim of second chapter is to explain and describe the methods used to solve matrix games, each of the two methods is practically explained for example. Content of the last part is the application of acquired knowledge to solving military tasks.

## **CIVIL-MILITARY CO-OPERATION (CIMIC)**

**Mária PJATEKOVÁ**

Consultant: Dr. Ľubomír Čech, CSc.

Armed Forces Academy of General Milan Rastislav Štefánik

Civil-Military Co-operation (as an abbreviation CIMIC) is an idea whose importance constantly increases not just in the Armed forces of the Slovak republic. It is a new phenomenon, which rapidly changes the character of peacekeeping or peacemaking missions and operations abroad. CIMIC was “born” because of one simple reason. North Atlantic Treaty Organization has understood that co-operation between NATO and civilian inhabitants can provide success of military missions and operations, not their fatal failure.

According to basic theory, Civil-Military Co-operation means the co-ordination and co-operation in support of the mission, between the NATO commander and civil actors, including national population and local authorities, as well as international, national and non-governmental organisations and agencies.

Firstly, the project concentrates on theoretical stuff. The author uses especially the most essential documents about CIMIC: “MC 411/1” and “AJP-9” as the excellent sources for writing the first chapter. The author deals with basic definitions, what CIMIC actually means and what the meanings of other related phrases are. Besides, the chapter includes functions, utilization and basic tasks of CIMIC. For better understanding, there are some illustrations.

The second chapter includes a lot of pieces of information about staff, who works in CIMIC. For instance, there is an explanation deals with, who CIMIC liaison officers actually are.

Besides, the following chapter is focused on CIMIC centres – for example what their tasks are, what kind of position they can have. For better understanding, there are simple pictures as well.

Furthermore, the author describes projects organized by CIMIC. There are few photographs of them.

Lastly, the project includes part, which deals with real situation connected with CIMIC in terms of the Armed forces of the Slovak republic. There is mostly described, how CIMIC should be in future because of no functioning nowadays. It means that the Armed Forces of the Slovak republic are just at the beginning of CIMIC structures creation process for the need of operations abroad. In addition, author uses narratives of particular CIMIC workers – the majors and the captain, who shared with their experience, impressions and pieces of information dealing with how CIMIC actually works on the “battlefield” in Afghanistan, where they served.

Moreover, project includes current pieces of information about Civil-Military Co-operation especially from the Ground Forces Headquarters, Ministry of Defence of the Slovak Republic and from Distribution centre NATO situated in Liptovský Mikuláš.

To sum up, after reading this project, a reader probably understands importance of Civil Military Co-operation as something, what can rapidly change the character of leading missions and operations abroad because it is really worth using CIMIC as a one of the main ways how to reach not just the military aims.

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## SPECIFIC FORMS OF COMMUNICATION OF MILITARY MANAGER

Ivana PRIHODOVÁ

Consultant: doc. PhDr. Mária Petrufová, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

Communication relates to the life of every man, strongly influenced, enriched by new knowledge and attitudes that regulates our conduct and helps us to integrate into society and creates social contacts. The essence of communication is the mutual information which is based on the delivery and receipt of information. Communication is a very important part of managerial function of leading people. Without effective communication managers can not affect individuals and in groups (teams) to achieve their performance goals. Communication can be considered the most important part of leadership and influence people to achieve the goal. Keeping people in the military organization requires that military professionals able to communicate rationally and motivationally. Every top manager, the manager, but especially the commander says, that communicates with his subordinates, colleagues, bosses and many others to influence their actions and behavior. Content of job of commander is to educate, teach, persuade, warn, guide, listen and command his people. Commander live by spoken word daily.

The topic of student work are specific forms of communication of military manager. The work deals with social communication, modes of social communication, communication process, communication manager, tasks of manager, specific forms of communication such as coaching and management of creative teams. The research work is aimed at understanding the specific forms of communication and the using of specific forms of communication in the practice of military officers.

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# EFFECTIVE MANAGEMENT AND ADMINISTRATION OF REALITES, PLANTS AND DEVICES - FACILITY MANAGEMENT AND POSSIBILITIES OF REALISATION

Ján SKALICKÝ

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Armed Forces Academy of General Milan Rastislav Štefánik

In my work I would like to consider the topic, which is not very well-known in Slovakia, the topic of management of buildings and building objects, called "facility management". My work begins with the start and following development of facility management from U.S. to Europe. Later on we find out what is its importance, we find out its benefits and its disadvantages. Finally I would like to mention subjects that are related to facility management, and I would like to characterize the facility manager.

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## **SCIENCE METHODS FOR DECISION SUPPORT**

**Lubica ŠTOFANOVÁ**

Consultant: Ing. Ondrej Kredatus, PhD.

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The work deals with methods for decision support and focuses on their classification and use in management, and also in military practice. The work is to clarify the importance of decision-making methods and its possible use in different levels of management. In the first chapter is defined decision, decision-making process and its species. The second chapter deals with methods for decision support and divides them into groups according to the proportion of empirical and theoretical approaches. The main part of the work refers to methods of operational analysis, based on the exact decision-making with the widest application. The various methods of operational analysis are progressively defined and described in the work. In the final part is listed the research, which captures the use of some methods of decision making in top management companies in the Slovak Republic. It is further elaborated the importance of using methods of operational analysis in military practice and example applications in military environments.

# SYSTEM OF MOTIVATION AND REMUNERATION IN ORGANIZATIONS SUCH AS AN ESSENTIAL FACTOR OF EMPLOYEES' ACTIVITY

Lenka ZVALOVÁ

Consultant: PhDr. Jaroslav Nekoranec, PhD.

Armed Forces Academy of General Milan Rastislav Štefánik

This work deals with system of motivation and remuneration of employees in organization. They present an important function of personnel management as the major tool by realization of organization goals. We concentrate on main tasks of management and an activity of managers in a process of motivation and remuneration of employees. There are emphasized important aspects of motivation and remuneration as the inseparable part of increase efficiency of the employees.

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