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EKONOMIKA A MANAGEMENT

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ÚVODNÍ SLOVO

Vážení čtenáři,

do rukou se Vám dostává třetí číslo čtvrtého ročníku našeho časopisu a při této příležitosti bych Vás chtěl informovat o změnách ve vydávání časopisu Ekonomika a management, které jsou a budou realizovány v roce 2012.

V závislosti na personálních změnách pracovníků vydavatele došlo k 1. 12. 2011 ke změně složení redakční rady časopisu, kdy předsedou redakční rady se stal proděkan pro vědu Fakulty ekonomiky a managementu Ing. Pavel FOLTIN, Ph.D. a dále došlo k obměně členů redakční rady.

Další významnou změnou je rozhodnutí redakční rady a vydavatele publikovat v časopisu od roku 2012 příspěvky pouze v anglickém jazyce s cílem zvýšit váhu časopisu jak v domácím prostředí, tak i v zahraničí s výhledem na zařazení časopisu do uznávané mezinárodní databáze v budoucnosti.

Věřím, že výše uvedené požadavky neodradí vědecké pracovníky, pedagogy a další autory od publikování v našem časopise.

Ing. Vítězslav JAROŠ, Ph.D.
výkonný redaktor

FOREWORD

Dear Readers,

You are just receiving the third issue of the fourth volume of our magazine. I would like to take this opportunity to inform you about some changes in publishing The Economics and Management magazine that are to take place in 2012.

As a result of the publisher personnel changes, the editorial board structure of the magazine has been changed since 1 December 2011. The Vice-Dean for Science of the Faculty of Economics and Management Dipl. Eng. Pavel FOLTIN, PhD was appointed the editorial board chairman. There are also new members in the editorial board.

Since 2012 the Editorial Board and Publisher will publish the contributions only in English language in order to increase the recognition of the magazine both at home as well as abroad. The aim is to include the magazine to a recognised international database in the future.

I believe that the above stated requirements will not discourage research workers, pedagogues, and other authors from publishing in our magazine.

Dipl. Eng. Vitezslav JAROS, PhD
Executive Editor

Romana BARTOŠÍKOVÁ, Eva HOKE a Josef POLÁŠEK

SPECIFICS OF BUSINESS RISKS

Abstract:
Nowadays, companies have to respond to sudden changes caused not only by the problems of growth but also collapses of different markets, decline of turnover, soaring of costs and problems with liquidity. It is obvious that increasing risk can have unfavourable impact on the companies and their economic results and thus it influences not only their current but also their future prosperity. We live in the modern times in which science and technology is developing intensively and new technologies are constantly being created. Nevertheless, there are some new risks connected with this phenomenon that did not have to be faced before. The article discusses business risks, their categories and possible ways of their elimination.

1 RISKS

Risk is an inherent part of every business. On one hand it is connected with the hope of huge profit, on the other hand, however, it is connected with the danger of business failure. Risk has therefore two sides – a positive and a negative one. The positive side involves a hope for success and profit. It is an impulse for development of the market economy. The negative one, however, dwells in the threat of gaining unfavourable economic results that could lead to bankruptcy. Increase in the number of risk factors which companies encounter is a typical feature for the present time. There are many causes of this phenomenon and the most frequent are structural economic changes, globalisation and weakening of access barriers leading to the substantial increase of the number of competitors. The expression "risk" assigns on one hand qualitatively different although on the other hand very close terms. Searching for a definition of the expression "risk" seems to be a semantic problem that cannot be universally solved. It depends on a branch, on what is meant by this expression as well as on the language in which "risk" is discussed [1].

The methodological process for the formation of the article was a combination of literature studies with the descriptive method and method of analysis and synthesis. Even though this topic is highly actually, barrier of writing this paper was the lack of literary sources. Beginning of the next year, the authors plan to research the business risks in the Zlín region.

Research will focus on small and medium enterprises. The research will define the the most frequent business risks and their management tools and extend the knowledge from the field.

In the economic and technical literature we most frequently encounter the following definition: "Risk is a likely value of loss caused by agents or receivers of the risk by the implementation of the threat expressed in monetary or other units." Risk is therefore meant to be a threat of occurrence of a certain loss. The financial theory defines risk as "volatility (fluctuation) of financial value (portfolio value, profit value etc.) around an expected value caused by changes of a number of parameters. Risk is also an inherent part of business, there is not any business subject that would not face a risk. Risk of a business subject is defined as „a risk that dwells in the probability of existence of a possible harm during particular time period, at a particular business subject (a company) as a result of an anomaly state (breakdown) in its regular failure-free state. Business risks influence the company as a whole; have impact on its owners, managers on all levels of management as well as on all employees of the company.

All companies aspire to protect themselves against risk. Risk cannot be entirely eliminated but can be managed. Particularly due to the economic crisis business risks have started to gain more and more importance in the last two years [4]. In 2010 1615 company bankruptcies were announced in the Czech Republic and it was a rise by 159 bankruptcies compared to the year 2009. The number of insolvency proposals concerning companies or entrepreneurs increased from 4425 to 4910. In average, every month in 2010 135 bankruptcies were announced as opposed to the year 2009 when it was by 14 fewer. Concerning trading companies in both years amount of bankruptcies was almost the same – 104 in 2009 and 105 in 2010. Regarding individuals – entrepreneurs – an average number of bankruptcies rose almost twice from 17 in 2009 to 30 in 2010 [6].

2 BASIC STRUCTURE OF BUSINESS RISKS

Basic structure of business risks is according to their seriousness and occurrence. In such structure we distinguish so-called small, middle and big business risks. Small risks do not limit company functioning, middle risks can bring more loss but the company is able to cope with them. Nevertheless, big risks can cause such damage which endangers the company in long-term perspective or can lead to its bankruptcy. Business risk has two aspects that have to be taken into account. It is a positive aspect that has impact on business subject as a kind of motivation and is connected with the hope for success and successful establishment on the market with the huge profit, with promising future of he company and its subsequent development. The negative aspect of the business risk is connected with doubts about loss, decline in turnover and failure on the market. Company management should bear in mind that risk is the main source of the company profit. Every company tries to protect itself against risks which, however, cannot be fully eliminated but can be managed. To be able to manage risks we need to be able to classify them. According to dependence on business activity we distinguish objective and subjective risks [2].

From the perspective of a business subject, sorting risks according to their content is the most important activity. Risks are sorted out according to what aspects of functioning of the business subject they deal with. In this case there are more possibilities of sorting out the risks. One of them is sorting by:

Types of business risks according to their actual content [4]:

- Technical risks (technically-technological) – we encounter them mostly in research and development of new products and technologies, they can, however, occur as breakdowns of production facilities;

- Production risks – they are limited or lack different resources (raw materials, materials, semi products, energy, workforce) and can endanger the production process and its results;

- Economic risks – they involve costs risks caused by increase of prices of individual cost items, they in addition involve inflation; risks connected with financial and budge policy etc.;

- Market risks – retail (demand) risks in relation to the amount of sales and price risks from the perspective of attaining retail prices – the source is the behaviour of the competitors;

- Financial risks – it is connected, for instance, with the availability of bank loans, changes of interest rates etc.;

- Political risks – the risks caused by macro-economic and social-political government (in the field of budget, finances, business, taxes, environmental protection, consumer protection etc.). Moreover, these are risks caused by activity that is in the existing political system illegal (e. g. revolt, national and racial demonstrations, wars, terroristic attacks etc.).

2.1 APPROACHES TOWARDS BUSINESS RISK

During every business decision-making process we always consider more options for solution. Of course, they are assessed according to the chosen criteria which can be - profit, revenue, risk, costs, liquidity or cash flow. It is in particular true that the higher the expected profit is the bigger risk it brings and vice-versa. The goal is to attain the highest revenue with the lowest risk and the highest possible liquidity. According to businessman´s preferable criteria we distinguish three attitudes towards risk [5]:

- A businessman can be reluctant to take a risk. In such case he aspires to avoid substantially risky projects and prefers lower revenue and fast liquidity;

- As opposed to that, a businessman with an inclination towards risking seeks risky projects with the highest revenues at the expanse of liquidity;

- The last attitude is called “a neutral attitude towards risk”. In this case a businessman tries to find during the decision-making process balance among all set criteria.

3 MANAGEMENT OF BUSINESS RISKS

The main goal of risk management is to raise the possibility of the success in a business operation and at the same time to minimise the danger of its failure. Therefore the work with the risk has to penetrate the whole business operation from the beginning till the end. The systematic work with the risk leads towards higher quality and success of the whole business. One condition is that an expert with particular knowledge and experience needs to participate in a business operation. Some bigger companies have their own specialised staffs that assure risk management. Smaller companies, however, outsource external consultants for this activity [4].

A truly effective risk management can be achieved only if [4]:

- Strategy of the subject is clearly defined with regard to its main goals including risk strategy;

- There is a well-functioning complex process of risk management which is supported by suitable information system (a system for decision-making support, expert system etc.);

- Management lays sufficient stress on risk management and there are persons responsible for risk management;

- There is a well-functioning internal company culture and ability to constantly develop and adapt to new risky challenges.

Risk management can be categorized into the following phases which are below briefly characterised [1, 3, 4]:

- Identification of risk factors – it is the essential and the most demanding phase of risk management. It requires experience and a systematic and creative approach. Suitable instruments which can be used in this phase are for instance: prompt lists (lists of questions arising from previous experience), control lists (an overview of all potential risk factors), team discussion (brainstorming) etc. The result of this phase is the determination of substantial amount of risk factors. Therefore it proves useful to divide such risks into internal (breakdowns of production facilities, fires etc.) and external ones connected with a business environment, such as decline in demand and retail prices, increase in purchase prices, undesirable changes of currency exchange rates and interest rates, competition etc. Another categorizing then can be – systematic risks which strengthen all companies in the same manner and unique risks specific for a given company;

- Determination of the importance of risk factors – in this phase of risk management we work with the most significant factors. For the determination of the importance of risk factors an expert assessment and sensitivity analysis is used. The expert assessment attributes the importance of a factor pursuant to the probability of the occurrence of such factor and the amount of an unfavourable impact on the company, its economic results and its financial situation. The sensitivity analysis is then used for the creation of more real values supported by the range of alternatives which reflect any uncertainty and provide some means for the validity of presumptions;

- Determination of the risk extent and its assessment – for the determination of the risk extent we can use a range of approaches. More demanding approaches lead to the establishment of an extent of the undesirable impact of risk events and their probable occurrence. For such approaches, for instance, a risk matrix or graphical schemes in the form of probability tree diagrams can be used. Less demanding approaches for the determination of the risk extent of dwell in the determination of weak points of the key risk factors. If the retail price is the key risk factor then the critical point of the retail price is such amount of this price at which a profit drops to zero. The closer this critical point is towards the expected retail price, the higher the risk is and consequently the company is more vulnerable;

- Risk assessment – the assessment of risk should lead to the conclusions about acceptability or unacceptability of a certain risk and influence, the consequent preparation and the selection and implementation of anti-risk precautions. The precaution for the risk decline of can be categorized into two groups – offensive and defensive. The offensive precautions aim at the risk prevention i. e. the elimination of risk events. The defensive precautions are then focused on the decrease of the undesirable risk impact of, i. e. weakening of the impact on the company in the event of the occurrence of a risk situation.

The choice of the particular precaution against the risk depends on many circumstances – in particular on financial and human resources which the company has at its disposal, then on possibility to implement such precaution which does not always have to be equal to the volume and quality of resources. Most risks simply cannot be restricted or even removed. Analyzing the results of the risk analysis (sometimes it is only a very brief consideration) we come to the conclusion of a necessity to decide what precaution to choose against risk. Some risks can be dislocated and some stopped. In some situations it is more suitable to avoid risk or to reduce such risk. When is it more suitable to transfer risk or retain it? When does a company have to avoid risks or reduce them or in what situations it suits most to be insured against risk? Suitability of each of the mentioned tool of risk management in a given situation is determined by the characteristic features of the risk itself [5].

Business risk is not firmly given. A manager or a businessman can reduce such risk by implementation of suitable approaches and precautions or he can (mostly in exceptional cases) entirely eliminate it.

CONCLUSION

Nowadays one of the most frequently used forms of the reduction of business risks is the insurance of expected risk situations with the usage of products of traditional commercial insurance companies. The insurance as a way of the transfer of the risk is based on the principle of grouping of a high amount of individual risks which enables to increase the possibility of the occurrence of risk situations and losses connected with them. In the event of a risk situation an insurance company either fully or partially indemnifies the particular loss of the company for a certain fee (insurance that is a part of company costs) according to conditions of the insurance contract. A traditional insurance area is pure risks. At present time, however, the insurance of many business risks, which earlier were considered to be unable to be insured, have been extended.

Bibliography references

[1] CROUHY, M. *Risk Management.* 3. vyd. Waltham: CIMA Publishing, 2007. 709 s. ISBN 978-0-7506-8174-2.

[2] JANATKA, F. *Rizika v komerční praxi*. 1. vyd. Praha: Wolters Kluwer, 2011. 316 s. ISBN 978-80-7357-632-5

[3] SPEDDING, L. *Business Risks Management Handbook.* 1. vyd. Waltham: CIMA Publishing, 2007. 737 s. ISBN 978-0-7506-8174-2.

[4] SMEJKAL, V., RAIS, K. *Řízení rizik ve firmách a jiných organizacích*. 3. vyd. Praha: Grada Publishing, a.s., 2010. 354 s. ISBN 978-80-247-3051-6
[5] TICHÝ, M. *Ovládání rizika. Analýza a management*. 1. vyd. Praha: C. H. Beck, 2006. 396 s. ISBN 80-7179-415-5.
[6] ŠTEFEK, J. *Loni bylo vyhlášeno 1615 bankrotů firem, o 159 více než bylo v roce 2009.* [online. [cit. 2011-08-08]. Dostupné z www: http://www.tyden.cz/rubriky/byznys/podnikani-a-prace/loni-bylo-vyhlaseno-1615-bankrotu-firem-o-159-vice-nez-v-roce-2009_190338.html

Gábor BERKOVICS, Zoltán KRAJNC

THE MAIN ISSUES OF AIR DEFENCE BETWEEN THE TWO WORLD WARS

Abstract:
The authors present the main issues of air defence between the two World Wars. They give a general overview of air components of the Italian – Abyssinian, the Japanese – Chinese and the Spanish civil war as well. This article demonstrates the major experience of the application of air forces especially anti-aircraft artilleries, fighter activities, monitoring and reporting services and civilian air defences.

INTRODUCTION

The appearance of flying instruments opened up new dimensions and prospects of a war. The military regimes adapted new tools for the military purpose at an incredible speed. Almost at the same time as the production of Montgolfier brothers' balloon and using it for military purposes (reconnaissance) began, the idea and practice to fight against it also appeared. The successful experiment on 5th June 1783 in Annonay was followed by I. C. G. Hayne Prussian engineer's book in 1784, which dealt with the new device for the military use. The airship was used for detection in the siege of Mabeuge, Metz and Charleroi in 1794, in the battle of Fleurus in 1795[1], and in the siege of Mainz, Stuttgart and Donauwörth[2]. A successful flight test on 17th December 1903 opened up a new era in the history of aviation, which led to the dynamic development of aeronautics. Not many devices „rose to the top" in such a short time in the means of armies.

As a result, the organization and development of the air force began[3]. The XXth century brought the revolution of military affairs as well. The adaptation and practical usage of scientific and technical achievements were probably the fastest in this field. First France, then Great Britain, Italy, Russia, and a bit later Germany organized and set up their air force system and first air squadrons. In 1910, Russian and French[4], in 1911 German and Austro-Hungarian armies as well used aircrafts for reconnaissance and courier services in their army manoeuvres. Airships also participated in these activities.

Soon the navy experiments began too. (On 14th November 1910 a successful take-off was implemented from the deck of Birmingham cruiser / USA /).

The military commands started, though with not the same capacity, to deal with effective protective options as well. Ground fire means and aircrafts themselves were the fundamental tools for them, but very soon they turned out not to be effective enough without the information of monitoring and reporting systems. This resulted

[1] Maloványi Sándor: A repülőgép megjelenése és alkalmazása az első világháborúban, ZMKA Hadművészet története tanszék, Jegyzet (évszám nélkül), p11.
[2] Siménfalvy Tihamér főhadnagy: A léghajó a tábori és várharcban. Magyar Katonai Közlemények (a továbbiakban MKK) 1909/11, p1016.
[3] Groehler, Olaf: A légi háborúk története 1910–1970, Zrínyi Katonai Kiadó, Budapest 1980., p11.
[4] A repülőgépek felderítő szolgálata az 1910. évi francia hadsereggyakorlaton, MKK 1911/1 5p2–60.

in the appearance of the three fundamental components of the air defence during the „Great War": fighter forces, anti-aircraft artillery and reporting posts.

At the beginning of the World War I it turned out that the defence was necessary against aircrafts, which counted to be still relatively new weapons, as during their exploratory activities their artillery firing caused significant losses. Their duties expanded soon, such as to bombing courier services, troops, transport junctions and objects, etc. It became necessary to apply own similar military equipment (armoured reconnaissance aircrafts), and also to develop a new type of a protective device (the anti-aircraft artillery) against the enemy planes. Although at the beginning of the war none of the countries had a significant amount of air vehicles, this soon changed dramatically[5]. The quantity of aircrafts by the end of the war increased 17 times in the German army, 31 times in the French army, 34 times in the British Army and 18 times in the Austro-Hungarian army; meanwhile the duties of the rudimentary air forces became more and more specialized. By 1918, the basic means of air forces formed: fighter, bomber, reconnaissance air troops, in about a 40-40-20% split[6].

During the war aircrafts not only performed reconnaissance, courier service, and fire-control tasks, but increasingly also bombing troops and objects. It became clear to all individuals and organizations dealing with military issues that the hinterland would become just as vulnerable as the front. This fact led to the creation of a civil air raid.

1 THE DEVELOPMENT OF AIR DEFENCE AFTER THE GREAT WAR

The dynamic evolution of aircrafts after the World War I – which were almost exclusively applied in military tactics - added a new task slowly becoming of a military strategic significance. Potential bombing of hinterland objects as aircraft duty became of growing importance, which I was only a sporadic activity during the World War.

Thus, not only the front and its immediate background needed to be protected from air strikes but also the protection of the inner areas of the mother country had to be planned and organized.

Air defence and its implementation according to the general idea consisted of the following:

- Air defence fighter forces;
- Air defence artillery;
- Monitoring and reporting systems;
- Passive defence regulations, which were divided into military and civilian parts;
- Prevention activities.

The high and even growing speed of the attacking means, the difficulties in detecting attacks, and the decreased reaction time to attacks became more and more serious problem for air defence. Because of them, the degree of the organization and preparation of air defence had a very high significance. It was reasonable to organize air

[5] Maloványi Sándor: A repülőgép megjelenése és alkalmazása az első világháborúban ZMKA Hadművészet története tanszék, Jegyzet (without year denotation) p46.
[6] Groehler, Olaf: A légi háborúk története 1910-1980. Zrínyi Katonai Kiadó, Budapest, 1983. p39.

defence on a territorial basis for the detection of air threats, repelling attacks (active air defence), or reducing the consequences of disasters (passive air defence[7]).
The armament restrictions and the total failure of Geneva Disarmament Conference[8] inspired the political and military leaderships to carry out the growing arming. The 20's and 30's wars were also analyzed with great attention. By the thirties, there was some new war experience available, which was definitely worth using in building up the air force, air defence, and operating them in the future. In the indicated period, three major wars were fought, in which air-military activities also took place. That experience could be used.

2 THE ITALIAN - ABYSSINIAN WAR

On October 3rd 1935 Italy started to attack Ethiopia to subjugate it and make it a colony. With more than 300 aircrafts, Italy was practically unrestricted air superiority from the beginning of the fight. The Ethiopian "Air Force" was just as insignificant and outdated as its ground-based air defence.[9] The Italian Air Force basically stroke on military formations, as the country almost didn't have any infrastructure and economic targets which were worth attacking. The attacks against the armed forces, as the response was minimal, were usually from a low-level flight. The Italian ground forces broke the Ethiopian barriers, which were considered to be stronger, by the focused strikes of the Italian artillery and air force. They could cause significant losses from the air in the Ethiopian troop concentrations, reserves, and the retreating forces.

The air force was also successfully used for dealing with the supply, air transport and medical tasks.[10] Direct actions against the population - sometimes very savage – had more of a psychological effect; however, they had no impact on the outcome of the war. The most serious problems of the Italian air force were thousands of kilometres of supply and resupply lines, a complete lack of the local possibility of components and refuelling, and the uncommon climate. This war gave very little practically useful experience and information for other air forces because of the excessively disproportionate balance of power on the two sides.

3 THE JAPANESE - CHINESE WAR

On 7th July 1937 Japan attacked China again to extend their jurisdiction. The Manchurian Japanese land forces and the flying forces of a part of the fleet[11] operated with one another according to a joint plant against the Chinese targets. Besides the military targets they attacked mainly large cities, however, they couldn't make rapid success as they expected, although the Chinese civilian population suffered serious losses. Moreover, at the beginning of the war the Japanese bombers attacking without a

[7] „Passive air defence, "the country's protection of a structure whose purpose was: a defence against air raids administrative, social and economic organization, to prepare the population for protection against air raids and air strikes to reduce the effects of the liquidation of damages." Hadtudományi Lexikon, p786. Magyar Hadtudományi Társaság, Budapest, 1995. Főszerkesztő: Szabó József
[8] Hadtörténeti Levéltár (HL) HM 1934. Eln.o. I. tétel 113129.
[9] They owned 6 pieces of POTEZ fighters. **Groehler**, Olaf: A légi háborúk története 1910-1980. Zrínyi Katonai Kiadó, Budapest, 1983. p125.
[10] Horváth Árpád: A hadirepülés évszázada. Zrínyi Katonai Kiadó, Budapest 1968. p124.
[11] About 300 aircraft belonged to the Army payroll, and 219 devices to the Navy.**Groehler**, Olaf: A légi háborúk története 1910-1980. Zrínyi Katonai Kiadó, Budapest, 1983. p127.

fighter cover suffered major losses. At the beginning of the war, the Chinese air force possessed more than 100 fighter planes. After the Japanese Air Force won the air superiority, they could operate relatively without limitations. It was achieved by striking airports, military infrastructure and supplies and not by civilian terror-bombings. By this – not yet finished – war, military leaderships could learn the following:

- Weaker, but still tightly organized ground forces and hunter aircrafts can cause unpleasant losses to fighter bombers even besides their fighter accompanies;
- It is essential for the different military air force means to co-operate, since the Japanese won air superiority over China involving their naval air force;
- In the shipping training, besides the individual coaching, practising bond tasks is of the major importance. The Chinese air force was in a drawback compared to its Japanese enemy in this field as well;
- It had no sense or effect to bomb civilian targets before winning air superiority, and even after that it was doubtful it could achieve the desired result;
- For the protection of the civilian population and industrial production, it is necessary to plan, organize and solve the early alarming, building of a shelter system, fire fighting, rescue, and covering, masking the potential civilian targets as well.[12]

From the above - very briefly - mentioned two wars, very few conclusions could be made for organizing a modern air force, air defence. However, from 1936, there was a war in Europe, which, regarding its geographical, climatic, expansion, quantitative and qualitative features, could serve with lessons worth learning. It was the Spanish Civil War.

4 THE SPANISH CIVIL WAR[13]

The open conflict of the republican and the coup forces began on 17-18th July 1936. The size and quality of Spanish air force and air defence corresponded to the category of what the contemporary Hungarian military trade press called the 'small countries' air defences and air forces. Out of the 277 aircrafts[14], which were considered to be moderately modern - 214 pieces were in the hands of the republican forces[15].

However, the "Franconian national" forces were very quickly supplemented with Italian[16] and German[17] air forces, and later the Republicans also received aircrafts from the Soviet Union[18]. The war was observed with a great interest by military regiments, including the Hungarian General Staff as well. They had relatively accurate and up-to-date information on the application of air force and air defence issues, and thus they could make the correct conclusions. The Hungarian military leadership gained information primarily from the "nationalist’" sources, and although they sometimes differed mainly in terms of quantities from the dominant source of Olaf Groehler, they were yet plausible. In the first half of 1937 the opposing forces were roughly balanced.[19] Both parties owned about 200-200 means (this quantity also increased

[12] Komposcht Nándor: A honi légvédelem háborús tapasztalatai a fejlődés szolgálatában. Légoltalmi Közlemények 1941. december 15., p393-394.
[13] Mainly according to HL. VKF 1.o. 2912/Eln. 1937 és a HL.VKF 1.o. 262/Eln. 1938.
[14] The Spanish air force mainly consisted of NIEUPORT-52-C-1and BREGUET 19A-2 aircrafts.
[15] Groehler, Olaf: A légi háborúk története 1910-1980. Zrínyi katonai Kiadó, Budapest 1983., p129.
[16] Mostly CR-32, SM-79 és SM-81 type aircrafts.
[17] Mostly JU-52, HE-45,46,51,70,111 aircrafts.
[18] I-15,16, SB és R-5 aircrafts.
[19] HL. VKF 1.o. 2912/Eln. 1937.

significantly for both parties during the year). They were 40-45% fighter aircrafts, 30-35% bomber aircrafts, 20-25% reconnaissance aircrafts. The Hungarian military leadership could only get some data about anti-aircraft artillery from the "national" side. According to that, they had 14 batteries of 75 and 88 cm anti-aircraft guns and an unknown quantity of air defence guns.[20] From the republican side it could only be found out that they had unknown number of anti-aircraft guns and cannons, many of which were received from the Soviet Union. There were no credible data about the construction and number of the applied monitoring and reporting patrols. By and large, however, the acquired information - especially in matters of the application - proved very important and useful, usable procedures and experience. These can be summarized in the following areas.

General Features:

- The application of air force and air defence was the most important issue of the leadership. The maximum efficiency was achieved by a strictly focused, centralized leadership. For the protection - not in the general organization, management, but in the concrete implementation of combat - however, a decentralized method often proved to be more effective;
- For the effective implementation of the air defence, very closely coordinated armaments, and in need, the allocations of tasks were needed. Certain safeguarding tasks could only be fulfilled with air defence artillery although the fighters were to be much more efficient;
- Safeguarding the manoeuvres could not be successfully resolved;
- A significant part of air force losses were caused by its own fire (due to the poor cooperation, flow and exchange of information and organization) and technical problems. This ratio could be up to 20% or more.

5 THE EXPERIENCE OF THE APPLICATION OF AIR FORCES

Air forces were used for the following duties:

- To detect enemy troops, protection systems, movements, transfers, vulnerable military and civilian targets;
- To strike on military and civilian targets: air force was particularly used against troops settled in the front-line and its immediate surroundings. They were mostly involved in solving tactical tasks. The effectiveness of attacking civilian targets and population was below the expected level. The most active actions were against the following priority military targets: "command battery posts, headquarters, infantry protection, charging infantry, tanks, battery posts, monitoring sites, suspicious thickets and forests, reserves, airports, motor car mainstays, ports". Interestingly, although it would be quite logical, the posts of anti-aircraft artillery were very rarely stroke from the air, strikes were tried to be repelled by artilleries. The most typical civilian targets were: „railways, trains, railway stations, warehouses, bridges, post centres, radio stations ";
- To fight in air with the bonds of the attacking air enemy;
- Manpower supply and transportation;
- Rarely courier;

[20] As a comparison, the Hungarian Royal Army’s similar toolkit consisted of 192 pieces of aircrafts then (Tóth Sándor: A Horthy hadsereg szervezete (1920–1944) I. rész, Hadtörténeti közlemények 1958/1, 63. oldal), 21 air defence artillery batteries, and 112 anti-aircraft artillery machine guns gradually deployed in war.

- Weapons used by air forces:
- The most important weapon was the bomb: against infantry mostly sensitive explosive bombs were used (mainly the 1-10 kg type). Incendiary bombs were used in the bushy, wooded parts. For larger targets and destructing forts 20-25 kg bombs were used. Bigger bombs were rarely - and rather for psychological effects (panic) - applied. The biggest bombs were usually 50 to 250 kg explosive ones;
- After the bomb release when attacking military targets – depending on the strength of the fighter protection and repelling fire – the flying devices often re-stroke, using machine gun fire;
- A mix of exploding and incendiary bombs were used against civilian targets; to demoralize the combatants and the civilian population flyers were often scattered down from aircrafts;
- As an occasional weapon, a smoke bomb was also sometimes used, especially against the field armies and the frontlines;
- According to the information given to the general staff no combat gas was used.

Battle methods of air forces:
- In case of stand combat and long-term protection: after a systematic, accurate detection, attacking the selected targets in several waves;
- In case of a moving battle: occasional attacks were in common, they were based on the information gathered during the battle, and on direct detection. Most of the air attacks against troops carried out by air forces were done during the day, at lower heights (usually from 50 metres altitude). Great care was taken to maximize the use of terrain features. The battle tasks were usually implemented by at least coy convoys – even in the detection at least by squads. Several consecutive waves followed one another above the target or the target area. The activities of aircrafts were strictly integrated into general combat operations, particularly in the regions of direct engagement. Air Force had the following place and role in breaking the protection: "artillery preparation, air strike, tank infantry attack and then infantry attack."
- The squad and regiment bonds approached civilian targets often at night, usually from high or at least from medium altitudes, then they descended low or to near-Earth-altitude and from there they carried out the bombing. To assess the impact, the bonds either stroke again after a short time of circling above or left the target area. They repeated the attack 4 or 5 times if it was necessary. Particular care was taken to choose and plan the approach path. Most bombers carried out the attacks with the fighter escort. The ratio of fighters could reach 50% of the bonds. Striking force bonds avoided well-organized anti-aircraft systems as far as it was possible.

FIGHTER ACTIVITY

The fighter forces were the part of the air force the same as the defence; they played a decisive role in carrying out their duties:
- One of their most important duties was to accompany and protect the attacking bonds. If there were no repelling fighters, they also took part in striking on ground targets;
- Their effectiveness in repelling the enemy’s striking bond was variable. Mostly they couldn’t take part in the battles at the front because if their alarm was from the ground, they were almost always late. However, if they were in preparedness

above the important protected objects, their mere presence was enough to repel the attackers.

AIR TRANSPORT

Manpower supply actually had significant major role only at the beginning of the Civil War when the "national" forces were dropped into Spain.

6 THE EXPERIENCE FROM THE APPLICATION OF ANTI-AIRCRAFT ARTILLERY

On the one hand air defence artillery assets were to protect troops, headquarters, warehouses near the front line, and bases. This protection could only be effective with a very good disguise, dispersal, coating and hiding. Poorly hidden goals "almost attracted" air attacks. Therefore, both parties used deceptive equipment as well. As we have already mentioned above, anti-aircraft artillery and its tools were rarely directly struck from the air. On the other hand, another important set of tasks of the anti-aircraft artillery was to protect the significant objects farther from the front. It had to solve the protection of industrial and political centres, transportation routes, destinations and other infrastructure, storage facilities and reserves. During the air defence of troops, it was a serious problem to get the information necessary for the fire control to the appropriate fire means in time. Therefore, the batteries often had their own reconnaissance, surveillance, and reporting services.

The effectiveness of air defence artillery assets was highly variable. Near the front line, usually from near-Earth altitude, they could shoot a maximum of 3-4 shots per batteries, and this could only be done if the observation and organization were very precise and well-planned. The biggest problem - almost insoluble – was to protect marches and manoeuvres. They couldn’t find an adequate solution to this problem. Out of the destroyed aircrafts 16-20% was shot down by air defence artillery devices[21]. The effectiveness of anti-aircraft guns was minimal. Even if they shot an attacking air device, they could rarely destroy it by the shot. Their effect was more of psychological nature. With their fire they could force aircrafts to move higher or to manoeuvre, thus reducing their task-implementation accuracy and efficiency. Recognition was a major problem. It was often the case that the anti-aircraft fire means shot any pop-up - often their own - aircrafts. They couldn’t avoid it even with the most careful trainings and a thoroughly prepared staff.

THE EXPERIENCE OF APPLYING MONITORING AND REPORTING SERVICE

There was little direct information about the monitoring and reporting services’ activity, but many conclusions could be drawn rather indirectly. Monitoring had to be organized for the protection of combat troops on the one hand, on the other, for civil objects. For the effective use of anti-aircraft fire means, observation and reporting posts had to be directly added to batteries. Their constant activities were necessary. To alarm fighter air forces and civil air defence, it was necessary to build up a relatively coherent system (according to the requirements a multi-line, seamless one). The theoretically

[21] This ratio was very similar to the results achieved in World War I.

predicted 8-kilometre detection distance on average fell by about 5 kilometres in practice, due to the low attacking altitude capacity of aircrafts. The monitoring and reporting services used public telephone and telegraph lines to the maximum. It was necessary for the monitoring entities to be equipped with vision and hearing amplifier devices.[22] The aircraft detection and identification were not reliable. Poorly organized monitoring and reporting systems caused huge losses and damage - typically for the Italians.

THE EXPERIENCE OF THE CIVILIAN AIR DEFENCE

The civilian air defence was led by the competent military authorities. They tried to insert it into the unified air defence system, with more or less success. The "national" forces often attacked civilian targets which were not too important from the military point of view. They primarily measured blows on political and economic centres and large cities. The financial consequences of the attacks were significant, but the impact on the population was much smaller. "After an air strike whole neighbourhoods became ruins." However, after the first shock, the population quickly overcame its initial panic, and they carried out rescue and restoration effectively, if it was well-organized. Aircraft attacks caused a relatively small number of fatalities. The construction of shelters, organized fire fighting, clearing up ruins, and the blackout significantly reduced losses. The most important experience was that: before the war the civilian population needed to be prepared what to do, otherwise in the first period of the war excessive loss could be expected.

CONCLUSION

The wars of the thirties, especially the Spanish Civil War, provided many valuable lessons for all armies, which were ready to analyze and evaluate the events. Of course, they could not give general, valid, complete rules and principles for all future wars, because they were local. The useful lessons the civil war taught were learnt by the military leaderships, also including the Hungarian military leadership - especially in matters of application - and used in a creative way, such as training, practice, and in the future in the field of planning, organizing and implementing combat operations.

Bibliography references

[1] Harcászati szabályzat (tervezet) I. rész. Harcászati elvek, Stádium sajtóvállalat részvénytársaság nyomdája, Budapest 1938.
[2] HL. VKF 1.o. 2912/Eln. 1937., HL.VKF 1.o. 262/Eln. 1938.
[3] Groehler, Olaf: A légi háborúk története 1910–1970, Zrínyi Katonai Kiadó, Budapest 1980.
[4] Komposcht Nándor: A honi légvédelem háborús tapasztalatai a fejlődés szolgálatában, Légoltalmi Közlemények 1941. 24. szám 393-396. oldal
[5] Tóth Sándor: A Horthy hadsereg szervezete (1920–1944), Hadtörténeti Közlemények 1958/1-2 51-70. oldal, 1958/3-4 64-85. oldal

[22] Primarily with binoculars and listening devices.

Sławomir BYŁEŃ

MODELING OF LOGISTICS IN COMPUTER ASSISTED EXERCISES

Abstract:
A command post exercise, supported by a computer simulation, is one of the primary training tools available to the Polish Armed Forces for training their commands and staffs on their joint mission essential tasks. The published article contains detailed information about modeling of logistics in computer assisted exercises. The Polish National Defence University (NDU) is the most important military university in Poland. The War Games and Simulation Centre (WG&SC) is an integral part of the University which is one of the most modern in Europe. WG&SC is equipped with the Joint Theater Level Simulation (JTLS). JTLS is an interactive, computer-based, multi-sided war gaming system that includes land, sea, air, intelligence and logistics functions. The article emphasizes that practical training is the most effective form for commands, staffs and troops to develop operation's scenarios or solve problems regarding the process of preparation for operations in the time of war, crisis or peace.

INTRODUCTION

The attainment of high level military commands and staff is possible thanks to the training conducted in conditions and situations approximate to those which prevail on the battlefield. Exercises are the most suitable form of the training ensuring "realism of battlefield"[1]. They allow verification of correctness and usefulness of doctrinal (operational-tactical) assumptions regarding rules and means of military operations in various conditions of the battlefield. Exercises constitute one of the best ways how to evaluate efficiency of organizational structures of individual ranks of command, efficiency of leadership system, armament and protection of operations. They allow to assess the degree of achieved combat readiness and also to verify possibilities of the armies to execute planned operational tasks in specific time and place.

The Polish War Games and Simulation Centre is the organizational unit of the National Defence University. The WG&SC located in Warsaw, provides facilities and equipment needed to conduct computer assisted exercises (CAX). The overall goal of the Centre is to train the military leader and his staff on the level of brigade, division, and corps. Figure 1 shows the position of WG&SC in the structure of the National Defence University.

[1] http://csikgw.aon.edu.pl/, [15.04.2011].

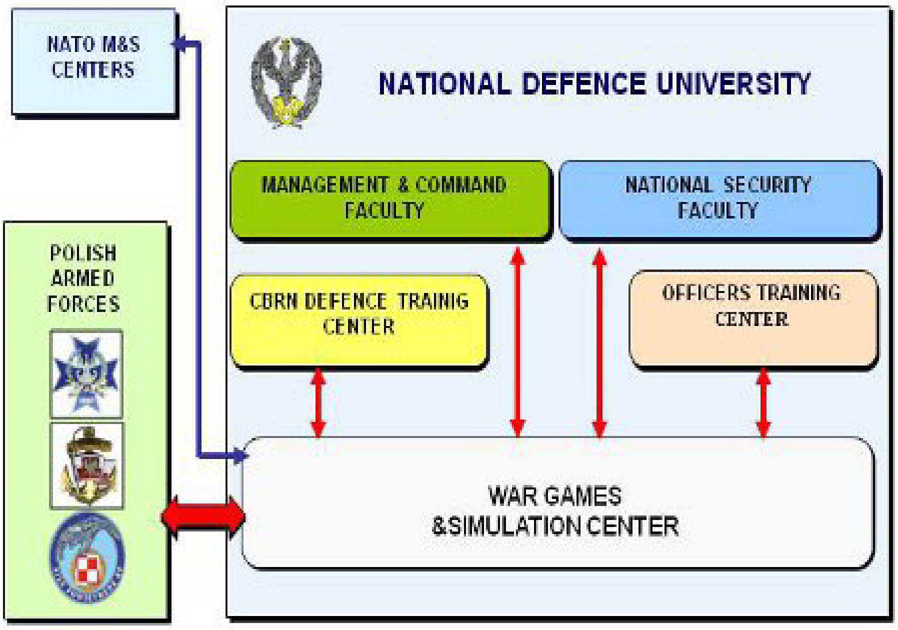

Figure 1 Position of War Games and Simulation Centre in the system of Polish armed forces training[2]
Source: http://csikgw.aon.edu.pl

1 MODELING CAPABILITIES OF LOGISTICS IN JTLS SIMULATION SYSTEM

The Joint Theater Level Simulation is an interactive, multi-sided simulation that can model air, ground and naval combats, with Special Operation Forces (SOF), intelligence support and logistical ones[3].

JTLS system has implemented all basic logistics support tasks but some of them are modeled differently than in the Polish Army. In particular the non-compatibility of some of logistical processes appears during tactical level CAX. We can observe differences between logistics support in JTLS and logistics support in the Polish Army. Differences exist especially between supply and field services. JTLS defines the division into ten classes of supply and the 272 miscellaneous categories of supply. Conceptually National Logistics defines five classes of supply and various kinds and groups of supply.

The following logistics capabilities exist in JTLS[4]:
- Movement of supplies by truck, barge, or rail;
- Transportation of units by rail, barge, or truck convoy;
- Use of trucks from one unit to pick up supplies from one or more other units, and deliver them to other units or locations;
- Mandatory transfer of supplies from one unit to another;
- Automatic or player-directed resupply of units;

[2] http://csikgw.aon.edu.pl/, [15.04.2011].
[3] Joint Theater Level Simulation, *Analyst's Guide*, (JTLS Document 01, version 3.3.0.0), March 2008, page 2-1.
[4] Joint Theater Level Simulation, *Executive Overview*, (JTLS Document 08, version 3.4.5.0), September 2010, page 3-11.

- Creation of logistics loads for the use in future orders;
- Creation of supply caches for the future use;
- Operation of pipelines, including drawing supplies from the pipeline and replenishing supplies;
- Capture of enemy supplies and recovery of own supplies;
- Modification of stock objectives and/or reorder thresholds of one or more supply categories for either a single unit, a group of units, or all units;
- Change of the depot from which a unit orders its supplies or from which a pipeline is replenished;
- Airlift and Airdrop Operations (through the air module);
- Sealift Operations (through the naval module);
- Evacuation of casualties (WIA) and evacuation of remains (KIA).

JTLS is partially based on the Field Manual FM 4-0[5]. Combat Service Support (CSS) tasks deal with personnel, arm, fuel, fixing and moving the force. These tasks are generally categorized into: logistics support, personnel service support and health services support. In JTLS all of the above tasks were placed into logistics operations which include: supply, maintenance, medical support and personnel support.

2 LOGISTICS OPERATIONS IN JTLS

2.1 SUPPLY

In the Polish Armed Forces supply and services consist of wide-ranging functions that extend from determining requirements at the strategic level to delivering items and services to the user at the tactical level. Supply involves acquiring, managing, receiving, storing, and issuing all classes of supply except class VIII (medical support). Field services involve feeding, clothing, and providing personnel services to soldiers. It consists of clothing exchange, laundry and shower support, textile repair, mortuary affairs, preparation for aerial delivery, food services, billeting, and sanitation.

<u>Consumption supplies</u>

In JTLS units do not consume supplies until they arrive in the game. The consumption may occur during a routine activity, with additional usage while in combat or involved in combat-related activities such as moving or flying. Supplies such as ammunition or bombs are consumed only when used. In JTLS, all supply consumption falls within three categories:
- *As Used*: the consumption occurs only if the asset is used, as with air weapons and ammunition;
- *Per Day*: the routine unit consumption, affected only by the length of time;
- *Per Person*: depends on the number of personnel in the unit over the length of time.

<u>Supply Categories</u>

JTLS can have an essentially unlimited number of supply categories; however, some of them are mandatory for certain game functions. The logistic directives are designed

[5] Field Manual No. 4-0, *Combat Service Support*, US Headquarters Department of the Army, Washington, DC, 29 August 2003.

to permit modifications to the automatic requisitioning and delivery process. To fulfil the requirements of a Logistics Player, you must be familiar with the concept of the operation, including the logistics concept, as well as the parts of the database that affect or are affected by logistics considerations.

2.2 TRANSPORTATION SUPPORT

Army transportation plays a key role in ensuring that Army execute global force projection and sustain forces in operations. Supporting the Army transportation is essential to the effective and efficient force generation and sustainment. The army transportation operates as a partner to deploy, sustain, and redeploy forces in all military operations. The transportation provides a vital support to the Army across the strategic, operational and tactical levels of war.

In JTLS the resources used to move supplies around the battlefield are modelled as entities called *Transportation Classes* (TC). *Transportation Classes* are described in terms of:

- The type of asset: truck, rail or barge;
- Their capability to carry supplies;
- Their vulnerability to an air attack, and a ground detection and attack;
- Whether they may use, must use, or are prohibited from using Material Handling Equipment (MHE) in the process of loading and unloading;
- The amount of time it takes to load and to unload one asset if MHE is not used.

In JTLS transportation support as a part of logistics operations has implemented:

- Implicit resupply;
- Explicit resupply.

Because JTLS is designed to train higher-level staff, the lower logistics functions can be automated. Implicit resupply is based on an explicit convoy distance. If the distance from the support unit to the requesting unit is less than the *Explicit Convoy Distance*, supplies are shipped to the receiving unit implicitly—i.e. without explicitly modelling a convoy moving the supplies. However, the support unit must have the supplies on hand. The convoy load/unload times and travel time are considered but the supplies cannot be interdicted.

If the distance between the requisitioner and the supplier is greater than the *Explicit Convoy Distance*, then the explicit convoy resupply occurs up to a maximum defined distance. The support unit automatically fills the order provided that:

- Transportation assets (rail, barges, or trucks) are available;
- Requested supply stocks are available.

Convoys are formed and sent to the requesting unit, observing load/unload times and travel times. Convoys are attritable i.e. they can be interdicted though convoys do not venture into hexes that are occupied solely by enemy units. *Explicit Resupply* does not apply to airlifting supplies, which requires an order to be executed.

2.3 MAINTENANCE

Maintenance is central to any mission operational success. Available maintenance system is agile and synchronized to the combat scheme of fire and manoeuvre. It anticipates force requirements. A commander who has 65 percent of his tanks operational may wisely delay an attack if he can realistically expect the repair process to have 90 percent ready within 24 hours. Alternatively, he can weigh the battle by allocating replacement systems. Maintenance is a combat multiplier. When opposing forces have relative parity in numbers and quality of equipment, the force that combines skilful use of equipment with an effective maintenance system has a decided advantage.

JTLS system has implemented:
- Modelling loss of combat systems (arms, military equipment);
- Modelling of repair and maintenance in home units (reconstitution of combat systems);
- Supply of arms, military equipment and repair parts.

The logistics module includes[6] a maintenance function that simulates the initial fail on the issue rate, repair of systems damaged in a combat, and their eventual return to the operational status. Each combat system has several attributes in the database; one of these specifies a percentage of casualties that can be recovered from a combat, and another specifies a percentage of those that will eventually return to their combat unit. This method is used to represent recovery and repair times of various combat systems.

2.4 HEALTH SERVICE SUPPORT

In the Polish Army health service support is a single, integrated system. It consists of all services performed, provided, or arranged to promote, improve, conserve, or restore the mental and physical well-being of personnel in the Army. This system encompasses ten functional areas of medical treatment: area support, medical evacuation, medical regulating, hospitalization, preventive medicine, health service logistics, dental, veterinary, combat operational stress control services, and medical laboratory support.

JTLS system has implemented:
- Modelling loss of personnel;
- Modelling of medical treatment in own units;
- Modelling medical evacuation KIA and WIA7;
- Medical materiel and equipment supply.

Personnel combat systems may have a number of systems that are in undergoing medical treatment[8]. The concept of evacuating personnel with long recovery times is represented in JTLS. Each faction has a WIA max. unit treatment attribute. Units that belong to the faction try to evacuate any casualties that will not be returned to duty before this time has elapsed. Personnel who are to be evacuated are transferred to the

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[6] Joint Theater Level Simulation, *Executive Overview*, (JTLS Document 08, version 3.4.5.0), September 2010, page 3-12.
[7] KIA – Killed in Action, WIA – Wounded In Action.
[8] Joint Theater Level Simulation, *Analyst's Guide*, (JTLS Document 01, version 3.3.0.0), March 2008, page 6-74.

casualty. In addition to representing casualties to be evacuated, JTLS can represent personnel remains, i.e. KIAs. In JTLS, if both casualties and remains are to be evacuated, casualties have priority for transport.

3 THE METHODS OF CONTROLLING LOGISTICS PROCESSES IN JTLS

Players interact with the simulation by sending orders to units over which they have command authority[9]. JTLS provides the commander of each Force Side with the ability to manage the allocation of command authority. The Player must interact with the model by monitoring the Information Management Tool, requesting reports, interpreting advisory messages, scheduling resupply airlifts, sending the resupply to units in trouble or to ones that do not have supporting units, changing stockage objectives and reorder levels, assigning new support units, or directing mandatory transfers of supplies.

JTLS models logistics play to suit the players' ability to manage many logistics functions. Logistics may be played more or less hands-off, or "unconstrained," for those groups which do not have sufficient log players or the inclination to manage the logistics flow. On the other hand, logistics in JTLS may be played in an entirely explicit or "constrained" mode, with all the attendant complexities of resupplying all units within the exercise scenario. The directed resupply requires that an order be input by a player.

In WG&SC, using JTLS during conducting CAX exercises, we apply both of the methods controlling logistics processes. The knowledge of the logistic concept is vital because tactical level logistics are not automatic. Logistics Players may enter orders to assess and change the way logistic support is accomplished. The menu Logistics Orders consists of four primary groups: ***Supply Transfers***, ***Requisition Parameters***, ***Logistics Operations*** and ***Logistics Assets***. Figure 2 shows the *Logistics Orders*.

Figure 2 Menu Logistics Orders in the JTLS system
Source: Author

9 Primary or shared authority.

The orders are *Mandatory Transfer*, *Directed Resupply*, *Push*, *Change Support Unit*, *Alter Requisition Level*, *Cache Supplies*, *Alter Pipeline Operations*, *Assign Pipeline Support*, *Establish Port Priority*, and *Direct to New Port*.

The *Mandatory Transfer* order directs one unit of any type to give a list of supplies to another unit. A Player, normally the Logistics Player in an exercise, may send this order to direct any unit to give supplies to another unit and specify the list of supplies. For the order to be executed, the units must be within an input-specified distance (below 24 km). The giving unit fulfills the order to the fullest extent possible reducing itself to a destroyed status if necessary. Figure 3. shows the *Mandatory Transfer* order.

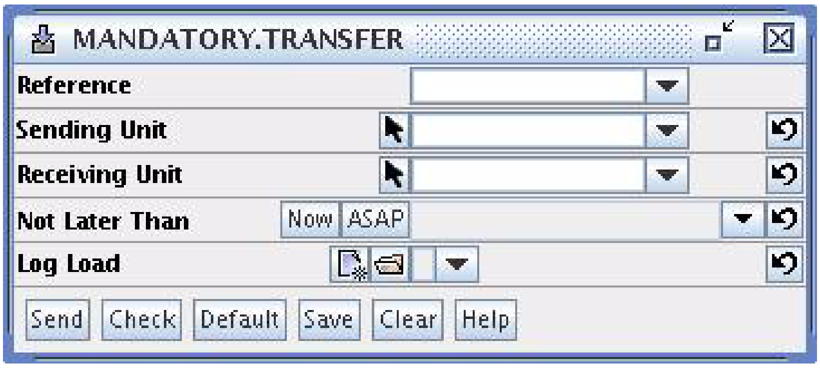


Figure 3 Menu Mandatory Transfer order in the JTLS system
Source: Author

The Directed Resupply order is used to direct a support unit (airbase or FARP[10]) to ship a single load of supplies to one other unit or to direct a support unit to dispatch a truck convoy with or without supplies on a *Supply Run*. Figure 4 shows the *Directed Resupply* order.

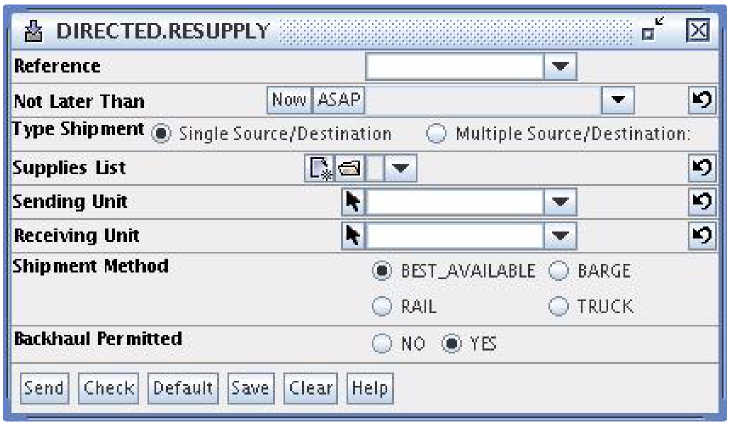


Figure 3 Menu Directed Resupply order in the JTLS system
Source: Author

A Player can direct that a support unit (airbase or FARP) sends a periodic shipment of supplies to another unit. This creates an automatic *Push* requirement at the shipping unit. An automatic push requirement is the second highest priority requirement.

[10] *Forward Arming and Refueling Point.*

The shipping unit will either ship the supplies or backorder them. The period may be any length of time. Figure 4. shows the *Push* order.

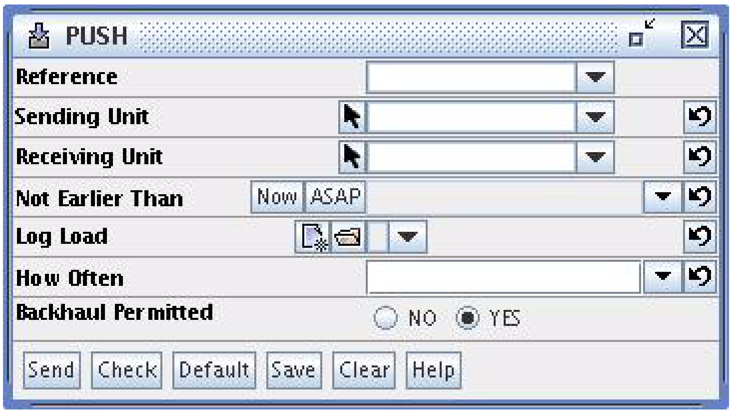


Figure 4 Menu Push order in the JTLS system
Source: Author

A Player can change a unit's routine support unit or any of its supply specific support units using the *CHANGE SUPPORT UNIT* directive. A unit will order all its resupply, except for those supplies specified explicitly by the category, from the default support unit. The unit's routine (default) support unit or supply specific support unit might be changed for the following reasons[11]:

- To provide better support. For example, the new unit may have more of the supplies needed by the unit;
- To provide more responsive support. For example, the new support unit is closer to the unit than the unit's current support unit;
- To provide a support unit. For example, the unit may not have a current support unit defined;
- To remove a support unit. For example, the unit may have moved to a location that cannot be supported by the available theatre support assets.

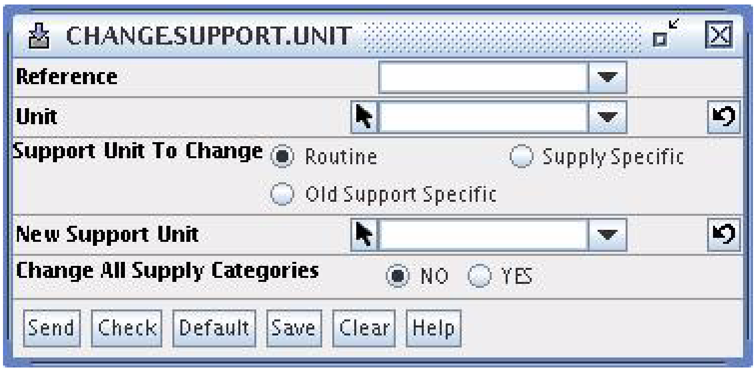


Fig. 5. Menu Change Support Unit order in the JTLS system
Source: Author

[11] Joint Theater Level Simulation, *Player's Guide*, (JTLS Document 12, version 3.3.0.0), March 2008, page 5-2.

The Controller can also greatly influence the sustainment process by changing strategic resupply, adding trucks, changing unit data parameters concerning supplies on hand, changing convoy speeds, sizes, load/unload times, and specifying implicit/explicit convoy distances.

As noted elsewhere, a Player may have the ability to order units to perform actions. These units are called “orderable units”. Generally, a Player must have authority over a unit to direct it to take any action. For example, to direct a unit to ship supplies to another unit, the Player must have authority over the shipping unit. The Player does not need authority over the receiving unit. Additionally, each *Force Side* has a “relationship” with each other *Force Side*. All relationships are initialized based on data input or a default.

CONCLUSIONS

Practical training is the most effective form for commands and staffs to develop operation’s scenarios or solve problems regarding the process of preparation for operations in time of war, crisis or peace. The Polish War Games and Simulation Centre provides facilities and equipment needed to conduct *Computer Assisted Exercises*.

All JTLS processes are doctrine-neutral for maximum flexibility. Model JTLS features detailed logistic modelling. The logistic directives are designed to permit modifications to the automatic requisitioning/delivery process.

Bibliography references

[1] Field Manual No. 4-0, *Combat Service Support*, US Headquarters Department of the Army, Washington, DC, 29 August 2003.
[2] The *JTLS Analyst’s Guide* (JTLS Document 01, Version 3.3.0.0), March 2008.
[3] The *JTLS Executive Overview* (JTLS Document 08, version 3.4.5.0), September 2010.
[4] *The JTLS Player’s Guide*, (JTLS Document 12, version 3.3.0.0), March 2008.
[5] http://csikgw.aon.edu.pl/.

Miroslav FODOR

VÝZNAM BEZPEČNOSTNEJ DOKUMENTÁCIE Z POHĽADU TVORBY INFORMAČNÉHO SYSTÉMU

Abstract:
The article deals with issues of safety documentation, which is very important in creating a secure information system. Specifically describes the elements of security documentation, which are security policy, security project, the safety plan, safety guidelines, emergency plans and disaster recovery plans and last but not least it is a security audit information system.

ÚVOD

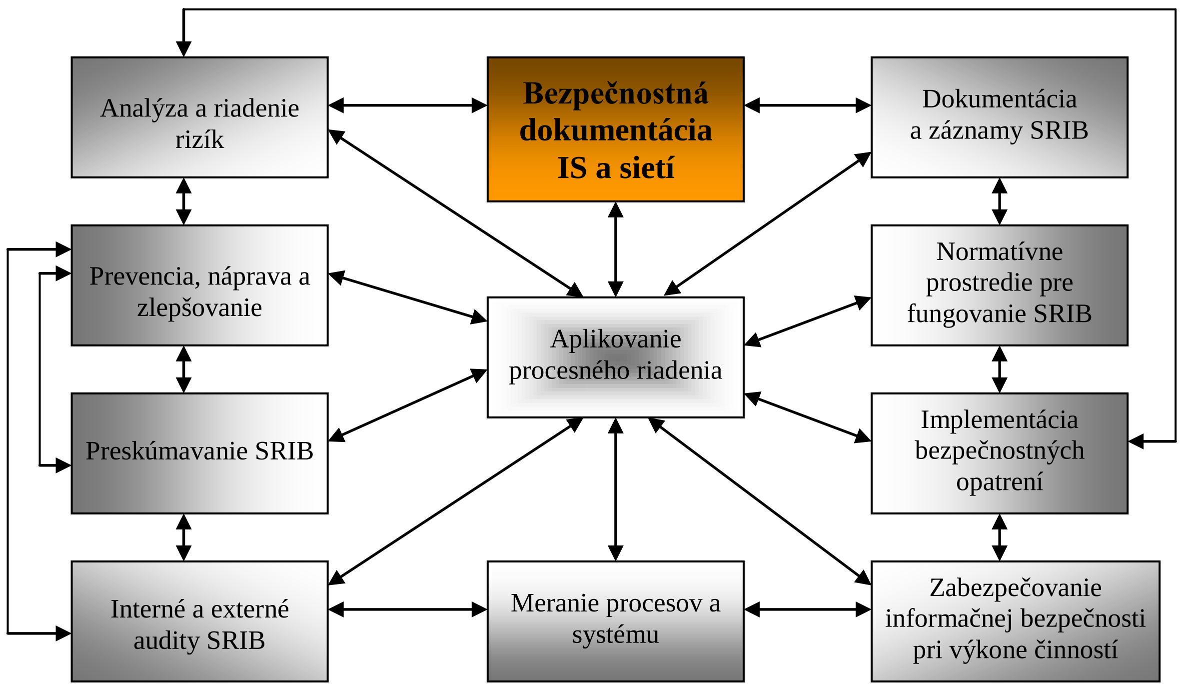
Informačná bezpečnosť sa ako každá oblasť ľudského života dynamicky vyvíja. Typickým problémom niektorých organizácií je nedostatočná pozornosť venovaná informačnej bezpečnosti, nedostatok času a finančných zdrojov pre túto oblasť, nedostatočný počet nezávislých kvalifikovaných pracovníkov, ktorí sa zaoberajú informačnou bezpečnosťou, nevhodná konfigurácia niektorých kľúčových IT zariadení a nízka úroveň povedomia väčšiny pracovníkov o bezpečnostných zásadách v organizácii. Mnoho vedúcich pracovníkov si preto dobre uvedomuje nutnosť chrániť informačný systém organizácie a potrebu zaoberať sa riešením tejto problematiky. Prax ukazuje, že žiadny bezpečnostný systém sa nezaobíde bez technických a procesných kontrolných mechanizmov, posudzovania kvality a vyhodnocovania jeho účinnosti, s následným návrhom primeraných opatrení pre zlepšenie [10].

1 BEZPEČNOSTNÁ DOKUMENTÁCIA V SYSTÉME RIADENIA INFORMAČNEJ BEZPEČNOSTI (SRIB)

Pri tvorbe akejkoľvek bezpečnostnej dokumentácie bez ohľadu na jej obsah a cieľ, je vhodné dodržať jej štruktúru a obsah jednotlivých kapitol - korkov. Jednotlivé kroky riešenia vychádzajú z bezpečnostnej dokumentácie, ktorá vzniká počas jednotlivých fáz životného cyklu informačného systému [5]. Na obr. 1 je vidieť umiestnenie bezpečnostnej dokumentácie v systéme riadenia informačnej bezpečnosti. Pri riešení problému ako dokumentovať systém riadenia informačnej bezpečnosti pre informačný systém alebo siete je možné vychádzať z [7]:

- Národné a medzinárodné normy vydávané štandardizačnými orgánmi (SUTN, BSI, ISO, IEC atď.);
- Rôzne štandardy asociácií a združení združujúcich odborníkov pre informačnú bezpečnosť (ISACA);
- Štátna legislatíva;
- Firemné metodiky systémových integrátorov a expertných firiem.

Nevyhnutná a/alebo požadovaná úroveň informačnej bezpečnosti je určovaná bezpečnostnými cieľmi, ktoré chce organizácia dosiahnuť. Bezpečnostný dokument by mal predovšetkým zdôrazňovať, čo je povolené a nie čo je zakázané. Bezpečnostná dokumentácia býva vypracovaná k určitému dátumu a vymedzenie rozsahu a spôsobu implementácie ochranných opatrení býva často presne popísané. Je to preto, lebo pri organizačnej zmene alebo zmene charakteristiky informačných systémov je potrebné bezpečnostnú dokumentáciu zosúladiť s novou aktuálnou skutočnosťou, aktualizácia bezpečnostnej dokumentácie sa odporúča podľa potreby, minimálne raz za rok.



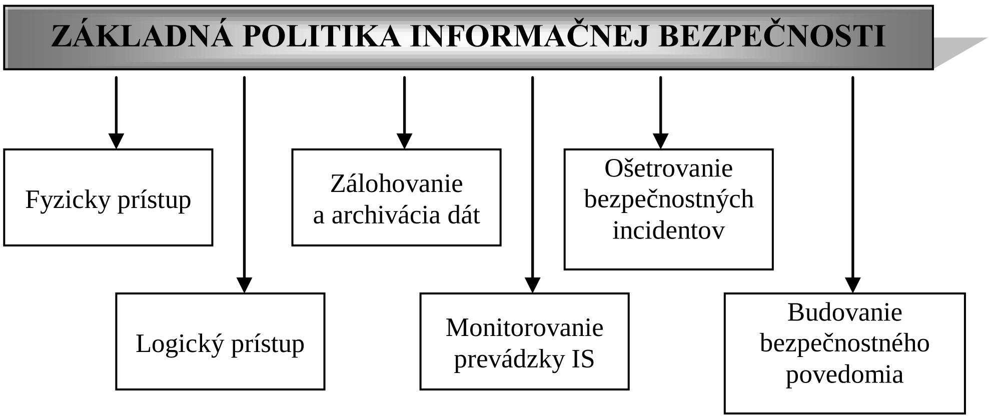
Obrázok 1 Postavenie bezpečnostnej dokumentácie v systéme informačnej bezpečnosti - zdroj [8]

Skladba platného záznamu jednotlivých druhov bezpečnostnej dokumentácie informačného systému by mala obsahovať:

- Bezpečnostná politika IS;
- Bezpečnostný projekt;
- Bezpečnostná zámer;
- Bezpečnostné smernice;
- Havarijný plán a plán obnovy činnosti;
- Bezpečnostný audit.

2 BEZPEČNOSTNÁ POLITIKA

Bezpečnostná politika je chápaná ako základný dokument organizácie, obsahujúci predstavu vrcholového manažmentu o riešení bezpečnosti a obsahujúci základné požiadavky na jednotlivé bezpečnostné oblasti všetkých informačných systémov. Informačná bezpečnostná politika by mala byť v súlade s celkovou hierarchiou bezpečnostnej politiky organizácie. Z bezpečnostnej politiky by sme mali vedieť odpovedať na otázky, ako sú: čo chceme chrániť; ako a prečo to chceme chrániť; čo robiť, keď dôjde k zlyhaniu. Uplatňovanie systémového prístupu k riadeniu informačnej bezpečnosti vyžaduje dôsledné rozpracovanie základnej politiky informačnej bezpečnosti do viacerých politík pre samostatné oblasti spadajúce pod informačnú bezpečnosť obr. 2.



Obrázok 2 Skladba základnej politiky informačného systému
Zdroj: autor

Medzi vyššie spomenutými politikami musí byť zachovaná kompatibilita, pretože [7]:

- Politika SRIB špecifikuje zámery organizácie z hľadiska riadenia informačnej bezpečnosti vychádzajúc zo základných bezpečnostných zámerov uvedených v globálnej bezpečnostnej politika;
- Politika informačnej bezpečnosti rozpracúva základné bezpečnostné zámery organizácie uvedené v globálnej bezpečnostnej politike pre oblasť informačnej bezpečnosti do úrovne potrebnej pre špecialistov;
- Bezpečnostná politika IS rozpracúva bezpečnostné zámery uvedené v bezpečnostnej politike informačnej bezpečnosti pre konkrétny IS;
- Bezpečnostná politika siete rozpracúva bezpečnostné zámery uvedené v politike informačnej bezpečnosti pre konkrétnu počítačovú sieť;
- Bezpečnostná politika bezpečnostnej brány, smerovača, prepínača rozpracúva bezpečnostné zámery uvedené v politike informačnej bezpečnosti na bezpečnostné nastavenia aktívnych prvkov siete;
- Politika pre riadenie logického prístupu rozpracúva bezpečnostné zámery uvedené v politike informačnej bezpečnosti pre riadenie logického prístupu k hardvéru, softvéru, aplikáciám, súborom a dátam.

Predpis-štandard	**Obsah bezpečnostnej politiky daného štandardu resp. predpisu**
Standard ISO/IEC TR 13335 (ISO/IEC 27005)	- Ciele a princípy bezpečnosti; - Organizácia/infraštruktúra bezpečnosti; - Bezpečnosť IT/stratégie analýzy; - Analýza rizík; - Bezpečnosť hardvéru a softvéru; - Bezpečnosť komunikácií; - Fyzická bezpečnosť; - Personálna bezpečnosť; - Bezpečnosť dokumentov/ médií; - Kontinuita činnosti organizácie; - Havarijné plány a plány obnovy; - Riadenie.

Norma ISO/IEC 17799	- Definícia informačnej bezpečnosti, jej celkové ciele, účel a dôležitosť bezpečnosti; - Vyhlásenie záverov manažmentu, podpory cieľov a princípov informačnej bezpečnosti; - Finančné prostriedky a ich zdroje, ktoré budú vynaložené na informačnú bezpečnosť; - Stručné vysvetlenie bezpečnostnej politiky, princípov a štandardov; - Definícia všeobecných a špecifických zodpovedností z hľadiska riadenia informačnej bezpečnosti, vrátane spôsobu ohlasovania bezpečnostných incidentov a reakcie na ne; - Odkazy na ďalšiu vnútropodnikovú dokumentáciu podporujúcu danú politiku.
Národný bezpečnostný úrad	- Ciele podnikateľa v oblasti ochrany utajovaných skutočností; - Očakávané utajované skutočnosti a ich špecifikácia v zhode s podnikateľskými zámermi; - Makroskopická analýza možných rizík ohrozenia utajovaných skutočností; - Predpokladané prostriedky na ochranu utajovaných skutočností a spôsob ich použitia; - Štruktúra, pracovné činnosti a právomoci bezpečnostného manažmentu podnikateľa.

Tabulka 1 Obsah bezpečnostnej politiky daný buď všeobecnými právnymi predpismi , resp. niektorým zo svetových štandardov - zdroj [3,4]

Dokument bezpečnostnej politiky by mal byť schválený manažmentom organizácie, publikovaný a vhodnou formou daný na vedomie všetkým dotknutým osobám. Mal by deklarovať vôľu vedenia organizácie a stanovovať prístup organizácie k riadeniu informačnej bezpečnosti. Za vypracovanie a aktualizáciu politiky je zodpovedný manažér SRIB, resp. útvar zabezpečujúci jeho činnosť.

3 BEZPEČNOSTNÝ PROJEKT

Zámerom bezpečnostného projektu na komplexnú ochranu IS je vymedzenie rozsahu a spôsobu technických, organizačných a personálnych opatrení potrebných na eliminovanie a minimalizovanie hrozieb a rizík pôsobiacich na informačné systémy z hľadiska narušenia jeho bezpečnosti, spoľahlivosti a funkčnosti. Bezpečnostný projekt na komplexnú ochranu IS býva vypracovaný pre informačné systémy používané v čase objednania projektu. Bezpečnostný projekt je dokument, ktorý je skôr vyžadovaný platnou slovenskou legislatívou ako medzinárodnými normami týkajúcimi sa informačnej bezpečnosti. Bezpečnostný projekt sa skladá z troch častí:

- Bezpečnostný zámer;
- Analýza rizík a plán implementácie nových alebo doplňujúcich ochranných opatrení;
- Ustanovenia, odporúčania, závery resp. bezpečnostné smernice.

4 BEZPEČNOSTNÝ ZÁMER

Bezpečnostný zámer IS je ďalším z rady bezpečnostných dokumentov, ktoré sú legislatívou a praxou vyžadované, ale medzinárodné normy týkajúce sa informačnej bezpečnosti tento druh dokumentu nepožadujú. Bezpečnostný zámer vymedzuje základné bezpečnostné ciele, ktoré je potrebné dosiahnuť na ochranu informačného systému pred ohrozením jeho bezpečnosti. Tento dokument pozostáva z [5,7]:

- Vymedzenie okolia informačného systému a jeho vzťah k možnému narušeniu bezpečnosti;
- Vymedzenie hraníc určujúcich množinu zvyškových rizík;

- Špecifikáciu technických, organizačných a personálnych opatrení na zabezpečenie ochrany aktív v informačnom systéme a spôsob ich použitia;
- Formuláciu základných bezpečnostných cieľov a minimálne požadované bezpečnostné opatrenia.

Bezpečnostný zámer v porovnaní s bezpečnostnou politikou má opisovať aj ďalšie atribúty riešenia informačnej bezpečnosti IS.

5 BEZPEČNOSTNÉ SMERNICE

Bezpečnostné smernice určujú pravidlá používania technických prostriedkov, prístupové a správcovské práva, organizačnú štruktúru, rozdelenie zodpovedností a právomocí a celkový proces ochrany aktív IS. Bezpečnostné smernice môžu byť súčasťou každého bezpečnostného dokumentu. Ich obsah sa líši od účelu použitia, od pracovníka, ku ktorému sú určené, resp. od typu príslušného bezpečnostného dokumentu. Bezpečnostné smernice by mali obsahovať:
- Technicko-prevádzkové zabezpečenie;
- Jednotlivé bezpečnostné politiky, resp. metodiky;
- Všeobecné a záväzné závery príslušného dokumentu;
- Pokiaľ si to okolnosti vyžadujú, mali by vytvárať prepojenie medzi ostatnými bezpečnostnými dokumentmi a to nie len z oblasti informačnej bezpečnosti.

6 HAVARIJNÝ PLÁN A PLÁN OBNOVY ČINNOSTÍ

Havarijné plány obsahujú informácie o tom, ako sa má prevádzkovať obchodná činnosť v prípade, že sú podporné procesy, vrátane IS, poškodené alebo sú nedostupné. Tieto plány by mali riešiť možné kombinácie niekoľkých scenárov zahrňujúce rôznu dobu prerušenia, stratu rôznych typov prostriedkov, úplnú stratu fyzického prístupu k budovám a potrebu návratu do stavu, ktorá by existoval, keby nedošlo k prerušenie. Havarijný plán môže byť súčasťou bezpečnostnej politiky alebo môže ísť aj o samostatný dokument. Havarijné plánovanie sa venuje tým hrozbám, ktorých výskyt je málo pravdepodobný a proti ktorým nie je možné prijať dostatočné preventívne opatrenia, pričom ich dopad by bol katastrofálny [7]. Havarijný plán by mal obsahovať:
- Miesta skladovania a počty náhradných dielov;
- Miesta skladovania a spôsob organizácie záloh dát;
- Obsah pohotovostného skladu technických a softvérových náhrad;
- Metodiku udržiavania aktuálnosti dát, softvéru a hardvéru;
- Metodiku aktualizácie a testovania hardvéru.

Súčasťou havarijného plánu je:
- Plán kontinuity činností organizácie (Contingency Plan) - súvisí s riadením kontinuity činností organizácie BCM (Bussines Continuity Management) a poskytuje návod, ako postupovať v poskytovaní služieb bezprostredne po bezpečnostnom incidente;
- Plán obnovy informačných systémov (Restoration Plan) - plán uvedenia informačných systémov do pôvodného stavu po havárii.

V pláne obnovy je najdôležitejším faktorom určenie, v akom poradí sa budú jednotlivé aktíva obnovovať. Ak životne dôležité dáta sa začnú obnovovať neskôr ako by bolo potrebné, v organizácii dochádza k stratám, ktoré môžu viesť až k zániku. Na druhej strane si je potrebné uvedomiť, že čím väčšia bude snaha o čo najskoršie obnovenie všetkých aktív, tým budú vyššie aj náklady na ich obnovu. V terminológii havarijného plánovania sa tento čas vola cieľová doba obnovy RTO (Recovery Time Objective).

7 BEZPEČNOSTNÝ AUDIT

Audit informačného systému možno chápať ako odborné nezávislé posúdenie koncepcie, návrhu, riešenia a samotnej rutinnej prevádzky informačného systému alebo jeho časti z hľadiska jeho schopnosti plniť bezpečnostné požiadavky. Čo sa vlastne posudzuje? Posudzujú sa tieto oblasti[5]:

- Objektová a fyzická bezpečnosť;
- Údržba subaktív IS, koncepcia bezpečnostnej politiky;
- Pripravenosť na riešenie mimoriadnych situácií s dopadom na funkčnosť IS, logovanie bezpečnostných incidentov v rámci IS, hardvérové a softvérové riešenia IS a jeho rozvoj;
- Kontrolné mechanizmy IS riadiace ich bezpečnosť;
- Zabezpečenie prenosu dát;
- Prepojenie IS s externými subjektmi z hľadiska zabezpečenia integrity a autenticity údajov;
- Zálohovanie, archivácia a likvidácia dát;
- Pracovné zázemie.

Audit IS môže vykonať vlastný zamestnanec, ale aj externý audítor. Interný audítor má lepšie znalosti o konkrétnom posudzovanom systéme a môže poznať miestne špecifiká. Avšak interný audítor je zamestnancom posudzovanej organizácie, čo môže spochybniť nezávislosť tohto posudzovania. Externý audítor posudzuje množstvo rozdielnych IS a preto nemôže disponovať detailnými poznatkami o každom z nich. Je obmedzený časom. Na druhej strane práve praktické poznatky zo širokého spektra a veľkého počtu posudzovaných systémov mu umožňujú zovšeobecniť tieto poznatky a pri audite konkrétneho systému sa namiesto zavádzajúcim detailom môže venovať hlavným faktorom vplývajúcim na stav IS.

ZÁVER

Počas životného cyklu informačného systému dochádza k množstvu rozhodnutí užívateľov, na základe ktorých konajú. Každé rozhodnutie produkuje iné výsledky a tieto výsledky môžu viesť k tvorbe, zmene, pohybu alebo zničeniu dát. V každej fáze tohto cyklu dát prechádzajú rôznym prostredím, ktoré ich vystavuje špecifickým hrozbám. Pri výstavbe informačného systému je možné definovať jej jednotlivé fázy a na ne neviazané kroky riešenia bezpečnosti. Všetky tieto kroky a riešenia by mali byť popísané a archivované v bezpečnostných dokumentoch organizácií, aby sme v prípade auditov, nežiaducich udalostí vedeli okamžite reagovať.

LITERATÚRA

[1] BS 25999 The Bussines Continuity Planning Standard, IT Governance, Specialist services and solutions for IT governance, risk management, compliance and information security., [CIT: 2011-09-31]. Dostupné na www: http://www.itgovernance.co.uk/BS25999.aspx.

[2] Girmanová, L. a kol, Nástroje a metódy manažérstva kvality, Košice, HF TU 2009, ISBN 978-80-553-0144-0.
[3] ISO/IEC TR 13335 (1-4): Informačné technológie - Smernice pre riadenie bezpečnosti informačných technológií.
[4] ISO 17799, ISO/IEC 17799:2005 Information technology - Security, Techniques – Code of practise for information security management.
[5] Loveček, T.: Bezpečnostné systémy - Bezpečnosť informačných systémov, EDIS Vydavateľstvo, Žilina, 2007, ISBN 978-80-8070-767-5.
[6] Nagyová, A.: Systém manažérstva informačnej bezpečnosti, In: Jakost - Quality 2007: 16. ročník medzinárodní konference : 20.-21. března 2007, Ostrava. Ostrava : Dům techniky, 2007. p. h-18-h-21. ISBN 978-80-02-01902-2.
[7] Strnád, O.: Systémový prístup k riadeniu informačnej bezpečnosti, SP Synergia 2008, ISBN 978-80-89291-20-5.
[8] Strnád, O.: Riadenie rizík informačnej bezpečnosti, Amos, Ostrava 2010, ISBN 978-80-904523-9-8.
[9] Šolc, M., Oravec, M.: Plán kontinuity- nástroj pre bezpečnosť kritickej infraštruktúry, Spektrum, ročník 11, číslo 1/2011, ISSN: 1211-6920 (print) 1804-1639 (on-line), str. 48-50.
[10] Šolc, M., Tomčová, T.: Prečo uvažovať o zavedení systému manažérstva informačnej bezpečnosti?, Bezpečnosť práce č. 2/2009, 28-33, ISSN 1335-4078, 28-33.

Soňa JIRÁSKOVÁ

MOŽNOSTI VYUŽITIA SYSTÉMU LESSONS LEARNED PRI BUDOVANÍ ZNALOSTNEJ ORGANIZÁCIE

Abstract:
This paper deals with possibilities of utilization Lessons Learned system in creating a knowledge-based organization. The article describes the basic steps of the Lessons Learned process that is implemented in The Slovak Armed Forces. It presents selected finding of empirical research that was realised as a part of a scientific research project "Possibilities of modelling behaviour of individuals and crowd in emergency situations".

ÚVOD

Ak sa v súčasnosti hovorí o úspešnej firme, poukazuje sa na jej dosiahnuté výsledky predovšetkým v oblasti obratu, zisku, podielu firmy na trhu a podobne. Dlhodobá úspešnosť subjektov na trhu je podmienená ich schopnosťou efektívne využívať disponibilné zdroje a predstihnúť konkurenciu. Ak hovoríme o zdrojoch, máme na mysli zdroje materiálne, finančné, personálne a v neposlednom rade i zdroje informačné. Konkurenčná výhoda však predovšetkým súvisí s úrovňou personálnych zdrojov. Dve organizácie môžu byť vybavené majetkom na rovnakej kvalitatívnej úrovni, jedna z nich však môže prosperovať lepšie. To, čo odlišuje skutočne úspešnú organizáciu od neúspešnej, sú kvalitní pracovníci a úroveň ich poznatkov, vedomostí, skúseností, zručností a znalostí[1]. Ak chce organizácia uspieť, musí vedieť využívať nielen informácie rôzneho charakteru, ale aj rozličné skúsenosti. Možno povedať, že ide o proces permanentného „učenia sa“. Je to jednak učenie sa od iných z externého prostredia a zároveň i učenie sa z vlastných skúseností z interného prostredia. Dôležité je nájsť vo vnútri organizácie oblasti, v ktorých sme najlepší a postupy z nich ďalej rozšíriť. Základnou podmienkou učenia sa je, aby dochádzalo k pravidelnej výmene informácií a k plodným diskusiám. Nie je možné, aby akýkoľvek nápad bol odsúdený už dopredu ako nereálny, prípadne nevhodný. Preto je veľmi dôležité, aby v organizácii bol pre výmenu informácií a formulovanie nápadov vytvorený patričný priestor, aby bola vytvorená priaznivá klíma – prostredie, kde je šírenie, zdieľanie a výmena poznatkov bežným javom.

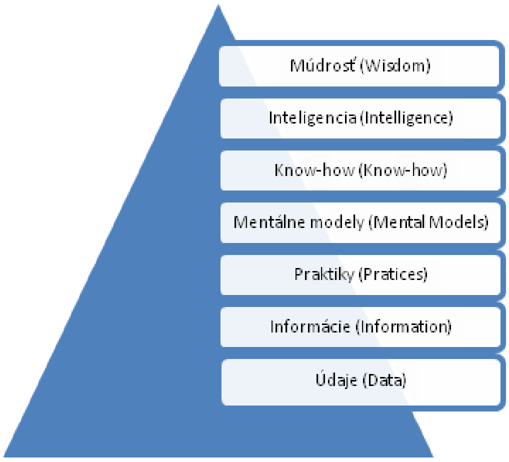
1 BUDOVANIE ZNALOSTNEJ ORGANIZÁCIE

Globalizácia a procesy internacionalizácie spolu so značnými sociálno-ekonomickými zmenami ustavične kladú nové nároky na zdokonaľovanie manažmentu. Tie sa odrážajú v hľadaní nových efektívnejších metód a techník riadenia a v zovšeobecňovaní poznatkov praxe. Nástup informačného veku a smerovanie k znalostnej ekonomike vyžadujú od organizácií či už súkromného alebo verejného sektora preukázať schopnosti prispôsobené zmeneným podmienkam. Z týchto dôvodov sa čoraz viac hovorí o **znalostnom manažmente** (knowledge management), pri ktorom ide o cieľavedomé vyhľadávanie, tvorenie, zlepšovanie, skladovanie, zdieľanie a využívanie informácií,

[1] STEJSKAL, J.: *Controlling – moderní nástroj dosahovaní cílů. Controllingové know-how z první ruky.* 2001.

vedomostí a poznatkov. Organizácia, ktorá sa prejavuje zvýšenou snahou učiť sa, adaptovať a meniť sa prostredníctvom ľudí, ktorí sa učia, sa označuje ako **znalostná organizácia**.

Znalostná organizácia buduje svoju existenciu na poznatkovej vyspelosti svojich pracovníkov, na hlbokom poznatkovom zdôvodnení svojich činností a procesov, na riadení na báze poznatkov a na cielenom riadení procesov získavania, zdokonaľovania a využívania samotných poznatkov. Poznatky je možné zobraziť v tzv. **poznatkovej pyramíde**, pričom sedem uvedených kategórií poznatkov vzájomne súvisí, sú navzájom prepojené a tvoria hierarchiu[2].



Obrázok 1 Poznatková pyramída
Zdroj: Burger, 2011.

Identifikovať vlastné cenné poznatky je jedna z dôležitých úloh manažmentu poznatkov, no táto úloha nie je jednoduchá, a to z dôvodu, že poznatky sú v hlavách ľudí a nie sú jednoduchým spôsobom prenositeľné na iných. Oproti iným zdrojom majú poznatky určité špecifické vlastnosti:

- Poznatky sú nehmotné a ťažko merateľné;
- Poznatky sú pominuteľné, a preto môžu zmiznúť v okamžiku;
- Poznatky sú súčasťou ľudských bytostí s konkrétnou vôľou;
- Poznatky nie sú v procesoch spotrebovávané, naopak niekedy s využívaním rastú;
- Poznatky majú v organizáciách veľkú šírku dopadu;
- Poznatky nie je možné kúpiť;
- Poznatky nemajú konkurenčný charakter, môžu byť zároveň využívané v rôznych procesoch súčasne[3].

Poznatky môžu mať formu teoretických vedomostí a formu praktických zručností, v tomto prípade ich možno označiť spoločným pojmom znalosti. Najčastejšie sa znalosti člena na implicitné a explicitné. Implicitné znalosti sú viazané na subjekt, získavajú sa skúsenosťami a praxou – majú intuitívny charakter. Explicitné znalosti sú formalizované, dajú sa zdieľať, prenášať, ukladať. V poslednom období sa čoraz častejšie hovorí i o tzv. tacitných (tichých) znalostiach, ktoré sa nedajú formalizovať[4]. Collison a Parcel[5] definujú znalosti nasledovne: „znalosti sú vedomosti získané na

[2] BURGER, I.: *Podnikový knowledge Management – konkurenčná výhoda*. 2010.
[3] BUREŠ, V: *Znalostní management a proces jeho zavádění*. 2007.
[4] PETRUFOVÁ, M.: *Strategický znalostný manažment, znalostná spoločnosť a znalostne orientovaná organizácia*. 2011.
[5] COLLISON, CH. – PARCELL, G.: *Knowledge management*. 2005.

základe skúsenosti“. Znalosti sú rozsiahlejšie ako dáta alebo informácie, pretože v sebe obsahujú nasledovné atribúty: vedieť ako, vedieť prečo, vedieť čo, vedieť kto, vedieť kde a vedieť kedy.

Veľmi dôležité je, aby v organizácii dochádzalo k intenzívnemu budovaniu vlastných interných znalostí cestou ich identifikácie, zdokonaľovania, distribúcie, tímového zdieľania a používania v riadiacich a produkčných procesoch. Či sa v organizácii dosiahne ochota zdieľania znalostí úzko súvisí s lojalitou zamestnancov a s organizačnou kultúrou. Pre úspešné využívanie znalostí je nutné splniť tri predpoklady:

- Zdieľanie znalostí pomocou spoľahlivej spoločnej technologickej infraštruktúry;
- Spojenie ľudí, ktorí majú znalosti a ochotu ich zdieľať, pýtať sa a počúvať;
- Implementované procesy, pre zjednodušenie zdieľania, overovania a výberu znalostí[6].

Procesy súvisiace so znalosťami sú nasledovné:

- Získavanie znalostí – identifikuje sa aké znalosti sú potrebné pre konkrétny účel;
- Šírenie znalostí – predstavuje zložitý proces, v ktorom sa správne znalosti musia dostať k správnym ľuďom a tí ich musia prijať a vhodne využiť;
- Hodnotenie znalostí – získané znalosti je potrebné vyhodnotiť v zmysle vykonania podrobnej analýzy, či sú vhodné, či spĺňajú požiadavky pre konkrétnu aktivitu, cieľ, účel alebo používateľa;
- Aktualizovanie znalostí – znalosti je nutné permanentne aktualizovať z dôvodu zmien vo vonkajšom i vnútornom prostredí organizácie;
- Využívanie znalostí – znalosti sú kľúčovým faktorom vedúcim k efektívnosti činnosti a k celkovému zvyšovaniu hodnoty organizácie;
- Uchovávanie znalostí – získané, dostupné a aktualizované znalosti je potrebné uchovávať pre ich budúce využitie[7].

Ak sa chce organizácia zmeniť na znalostnú, musí si vybudovať systém znalostí – určitú databázu informácií, a to tak, aby všetci pracovníci mali prístup ku skúsenostiam ostatných a zároveň mohli do systému prispievať svojimi skúsenosťami. V tomto procese je možné využiť i tzv. systém Lessons Learned.

2 SYSTÉM LESSONS LEARNED V OZBROJENÝCH SILÁCH SR

V snahe zabezpečiť jednotný a koordinovaný postup pri získavaní poznatkov a využívaní skúseností v podmienkach Ozbrojených síl Slovenskej republiky boli v roku 2008 prijaté a v roku 2011 novelizované „Smernice náčelníka Generálneho štábu OS SR o získavaní poznatkov a využívaní skúseností“. Cieľom bolo upraviť zhromažďovanie poznatkov, ich identifikáciu a zovšeobecňovanie skúseností s pozitívnym alebo negatívnym dopadom na činnosť zložiek OS SR za účelom prijatia opatrení na odstránenie chýb a zlepšenie podmienok v budúcnosti, zároveň pre to vytvoriť patričný mechanizmus, stanoviť úlohy, postupy a zodpovednosti jednotlivých organizačných zložiek ozbrojených síl, veliteľov, ako aj všetkých príslušníkov ozbrojených síl v oblasti riadenia tohto systému.

[6] VÁVRA, K. – ŠTANCL, L.: *Rozvoj ekonomiky obrany štátu ve znalostní společnosti cestou k racionalizaci hospodaření.* 2011.

[7] DIAČIKOVÁ, A.: *Reálny manažment znalostí vo firemnej praxi.* 2010.

Databáza systému Lessons Learned by mala byť prioritne zameraná na prípravu a nasadenie jednotiek v operáciách a mala by sa týkať nasledovných oblastí:
- Operácie (misie);
- Výcvikové aktivity;
- Cvičenia;
- Výskum (odborné a vedecké skúmanie alebo pozorovanie);
- Prípadne ďalšie činnosti a procesy v rezorte ministerstva obrany.

Smernica uvádza, že základné princípy, ktoré zásadne podmieňujú úspešnosť a efektivitu procesov Lessons Learned, sú:
- **Spolupráca (súčinnosť)**, ktorá je nutná na zaistenie toho, že všetky zložky sú pevnou súčasťou tohto procesu a plne podporujú dosiahnutie zlepšenia (pokroku);
- **Koordinácia**, ktorá vyžaduje od každej zložky dôsledné plánovanie s cieľom odstrániť rozpory pri vynaloženom úsilí a zaistiť včasné a efektívne riadenie svojej práce;
- **Komunikácia**, ktorá uľahčí celý proces a zaistí, aby všetky zložky boli včas a podrobne informované o vývoji v procese Lessons Learned, prebiehajúcich nápravných akciách a zlepšení (pokroku).

Proces Lessons Learned pozostáva z nasledovných po sebe idúcich krokov:
1. Pozorovanie a získavanie poznatkov z pozorovania.
2. Analýza.
3. Schválenie záverov analýzy.
4. Vznik identifikovaného poznatku (Lessons Identified).
5. Realizácia opatrení a monitorovanie.
6. Overenie účinnosti vykonaných opatrení.
7. Ponaučenie zo skúseností (Lessons Learned).
8. Zdieľanie informácií o ponaučeniach zo skúseností.

Proces Lessons Learned sa začína na základe **poznatku**, prípadne **pozorovania** vzniknutej situácie alebo aktivity, ale tiež aj na základe hodnotenia vojenských cvičení alebo hlásení z operácie v zahraničí. Poznatok z pozorovania je problém, ktorý je potrebné riešiť, alebo pozitívna skúsenosť, ktorú treba zovšeobecniť. Pri každej aktivite existuje očakávaný výsledok alebo výstup. Ak sa očakávania nenaplnia alebo sú prekročené, je to príležitosť poučiť sa. Všetky odchýlky od očakávaného výsledku je potrebné zdokumentovať ako poznatok z pozorovania, ktorý popisuje chronologický sled udalostí, podmienky a okolnosti sprevádzajúce tieto udalosti a ostatné kvantifikované podrobnosti. Získavanie poznatkov a využívanie skúseností je povinnosťou všetkých veliteľov. Veliteľ poznatok zhodnotí a rozhodne, či je vhodný alebo nevhodný pre proces Lessons Learned, či je nutná jeho ďalšia analýza, či bude poznatok analyzovaný a riešený vo vlastnej pôsobnosti alebo bude postúpený nadriadenému stupňu spolu s návrhmi na výkonnú zložku a nápravnú činnosť. Za **poznatok nevhodný** pre proces Lessons Learned sa považuje taký, ktorého príčina je v osobnom zlyhaní jednotlivca alebo v neuplatňovaní platných predpisov a nariadení, ak jav je ojedinelý a nie je pravdepodobné, že sa bude opakovať, alebo ak sa jedná o evidentnú sťažnosť. Poznatky sa predkladajú prostredníctvom štandardizovaného formulára. Vhodné poznatky z pôsobenia v operáciách a misiách medzinárodného krízového manažmentu prerokúva pracovná skupina Lessons Learned, ktorá pôsobí na Generálnom štábe OS SR.

Analýza ako proces detailného skúmania s cieľom hľadania príčin nedostatkov, je používaná na dôkladné porozumenie oblastí, v ktorých je potrebné zlepšenie. Je kľúčom k úspešnej identifikácii poznatku, ktorý podporí rozhodnutie o akcii potrebnej k vyriešeniu problémov. Cieľom analýzy je premena vhodného poznatku na identifikovaný poznatok (Lessons Identified).

Analýza poznatku pozostáva z troch etáp:
- Identifikácia pozorovaného problému;
- Stanovenie krokov a opatrení nápravy;
- Vypracovanie plánu realizácie.

Poznatky analyzuje príslušný odborný orgán, do ktorého pôsobnosti uvedená problematika patrí. Výsledky analýzy spolu s navrhovaným nápravným opatrením odborný orgán predkladá pracovnej skupine Lessons Learned prostredníctvom formulára analýzy. Návrh opatrení zahŕňa určenie výkonnej zložky, ktorá bude poverená realizáciou opatrení na odstránenie nedostatkov a termín vykonania nápravných opatrení. **Identifikovaný poznatok** vzniká z vhodného poznatku po vykonaní jeho analýzy. Identifikovaným poznatkom je pozorovanie alebo zistenie, ktoré sa považuje za užitočné pre ostatných a ktoré posúdila pracovná skupina Lessons Learned. Sú to poznatky z pozorovania, vo vzťahu ku ktorým sa pripravovali nápravné opatrenia.

Po schválení poznatku pracovnou skupinou Lessons Learned a vydaní úloh nasleduje realizácia prijatých opatrení, ktorá spočíva v plnení vydaných úloh a nápravných opatrení výkonnou zložkou. Táto zodpovedá za vypracovanie plánu nápravného opatrenia. Veľmi dobrým riešením je stanovenie niekoľkých medzníkov v procese nápravy. Na základe sledovania týchto medzníkov je možné merať úspešnosť realizácie plánu nápravného opatrenia. Monitoring nadriadeným stupňom sleduje stav realizovaného nápravného opatrenia a informuje pracovnú skupinu Lessons Learned o jeho priebehu. Overovaním účinnosti vykonaných opatrení sa zisťuje, či zrealizované nápravné opatrenie je správnym riešením pôvodného problému, ktorý bol zistený. Potvrdenie správnosti nápravných opatrení je potrebné pre zhodnotenie účinnosti vykonaných opatrení vzhľadom k odstráneniu zistených nedostatkov. Overenie môže vyžadovať dodatočné analýzy, či opatrenia priniesli požadovaný výsledok, alebo či je potrebné vrátiť identifikovaný poznatok naspäť do procesu analýzy.

V prípade, že všetky nápravné opatrenia sa vykonali a osvedčili, sa identifikované poznatky (Lessons Identified) stávajú ponaučením zo skúseností (Lessons Learned) a sú zahrnuté do databázy. Podľa charakteru a vzťahu zovšeobecneného poznatku je možné využiť ho v rámci celých Ozbrojených síl SR, alebo len v podmienkach úzko špecializovaných jednotiek. Je dôležité, aby získané skúsenosti boli čo najrýchlejšie zapracované do vnútorných predpisov a vojenských doktrín.

Hodnota procesu Lessons Learned nadobúda svoj význam len vtedy, keď informácie vytvorené týmto procesom sú kedykoľvek prístupné osobám, ktoré ich potrebujú. Zdieľať sa môžu aj informácie, ktoré nie sú oficiálne súčasťou procesu Lessons Learned, napríklad pravidelné správy o bojovej činnosti v misii, záverečné správy z cvičení, vyhodnotenie zahraničných aktivít, zápisnice z rokovaní a pod. Postupy zdieľania informácií v prostredí OS SR sú nasledovné:
- Nová informácia je aktívne rozoslaná;
- Nová informácia sa umiestni na intranetovú stránku OS SR;
- S novou informáciou budú oboznámení členovia pracovnej skupiny Lessons Learned Generálneho štábu OS SR na pravidelnom zasadaní;
- Informácia je zaradená do verejne prístupného súboru poznatkov (databázy);

- Informácia je na základe odporúčania spracovateľa poskytnutá do databázy NATO alebo EÚ[8].

3 MOŽNOSTI IMPLEMENTÁCIE ZÁVEROV PROJEKTU VÝSKUMU DO SYSTÉMU LESSONS LEARNED

V snahe prispieť k využívaniu skúseností profesionálnych vojakov, ktorí sa zúčastnili misií bol v roku 2010 - 2011 na Katedre manažmentu Akadémie ozbrojených síl gen. M. R. Štefánika v Liptovskom Mikuláši riešený vedecký projekt pod názvom „Možnosti modelovania správania sa jednotlivcov a davu v krízových situáciách“. Hlavným cieľom bolo identifikovať a analyzovať skúsenosti vojakov vysielaných do misií o správaní sa jednotlivcov a davu v extrémnych krízových situáciách, do ktorých sa dostali a na základe týchto skúseností vytypovať možné typové správanie sa v krízových situáciách pri asymetrických ohrozeniach. Zámerom tiež bolo prispieť k tomu, aby sa skvalitnila psychická pripravenosť jednotlivcov a zvýšila sa pohotová reakcia jednotiek plniacich úlohy v rámci NATO na ohrozenie. Súčasťou vedeckého projektu bolo pripraviť typové scenáre žiaduceho správania sa jednotlivcov a davu v jednotlivých krízových situáciách pri asymetrickom ohrození.

Výskumu sa zúčastnilo 127 profesionálnych vojakov z rôznych útvarov Ozbrojených síl SR, ktorí pôsobili prevažne v misiách ISAF, KFOR a UNFICYP. V skúmanej vzorke prevažovali muži, 53,5 % respondentov bolo vo veku od 26 do 30 rokov. V rámci projektu výskumu boli použité exploratívne metódy vedeckého výskumu, a to: technika dotazníka, technika riadeného rozhovoru a metóda obsahovej analýzy vybraných dokumentov.

Zo spracovaných výsledkov výskumu vyplynulo, že za najslabšiu mieru pripravenosti v porovnaní s vojakmi zahraničných armád profesionálni vojaci OS SR považujú oblasť kultúrne – antropologickú, t.j. pociťovali nedostatky znalostí o náboženských zvyklostiach, občianskych zvykoch, tradíciách, zásadách a prejavoch správania sa domácich obyvateľov v priestoroch nasadenia. Za nedostatočné tiež považovali svoje znalosti o identifikácii, prípadne predikcii situácií, v ktorých dochádza k samovražedným útokom atentátnikov. Túto oblasť pripravenosti vnímali respondenti veľmi citlivo, vzhľadom na bezprostredné ohrozenie ich života a zdravia. Účastníci prieskumu sa vyjadrili, že je potrebné zvýšiť i jazykovú prípravu profesionálnych vojakov, a to nielen anglického jazyka, ale i základov jazyka miestneho obyvateľstva.

Vzhľadom na zistené skutočnosti autori vedeckého výskumu odporúčajú, aby sa v príprave profesionálnych vojakov preferoval praktický nácvik, pri ktorom by sa využili skúsenosti a zážitkové stavy vojakov, ktorí sa s takýmito situáciami v priestoroch nasadenia už stretli. Dôležité je osvojiť si základné vedomosti o kultúre národov, etník v priestore nasadenia, o zvykoch, tradíciách, obyčajach a tabu, čo by umožnilo efektívnejšie riešiť problémy vo vzťahu k civilnému obyvateľstvu a konštruktívnejšiu komunikáciu zúčastnených strán. Poznanie by takto prispelo k zmierneniu násilia s náboženským, etnickým, rodovým či iným pozadím.

Riešiteľský kolektív vypracoval na základe sekundárnej analýzy zhromaždených dát deväť typov modelových situácií, do ktorých sa počas pôsobenia na misiách dostávajú

[8] *Smernice náčelníka GŠ OS SR o získavaní poznatkov a využívaní skúseností. ŠbO – 179-4/2011-OAD.*

profesionálni vojaci z hľadiska interakcie účastníkov davu. Modely správania sú zamerané na situácie: zhromaždenie väčšieho počtu ľudí, správanie sa účastníkov davu presúvajúcich sa na miesto určenia, na účastníkov davu, ktorý postupuje proti kordónu zasahujúcich vojakov, vstupuje do chráneného priestoru, do vzájomného napádania, bitky, agresívne správanie pri útokoch.[9]

Bolo by nanajvýš vhodné, aby uvedené skúsenosti, poznatky profesionálnych vojakov ako i modely správania sa davu boli zapracované do databázy systému Lessons Learned.

ZÁVER

Znalostná organizácia sa učí trvalým zlepšovaním toho, čo už bolo v minulosti vykonané a zdokonaľovaním jednotlivých krokov v procesoch. Možno usúdiť, že spracované poznatky predstavujú organizačný kapitál, pod ktorým možno chápať súhrn vedomostí, ktoré vlastní organizácia a ktoré sú uložené a prístupné v rozličných databázach, manuáloch apod. V prípade Ozbrojených síl SR je to systém Lessons Learned, ktorý by mal prispieť k budovaniu znalostnej organizácie. Možno povedať, že proces Lessons Learned je jedným z najdôležitejších nástrojov na podporu veliteľov pri vydávaní potrebných rozhodnutí na odstránenie nedostatkov a na zaznamenávanie, zlepšovanie a zverejňovanie najlepších postupov. Zároveň je potrebné aby v každom jednotlivcovi v súvislosti s „učením sa“ a využívaním skúseností iných prebehol nasledovný proces:

- Spoznať novú praktiku (preštudovať podklady);
- Porozumieť jej podstate a hodnote (v diskusii);
- Akceptovať zmenu t.j. mentálne prijať myšlienku, že nová praktika je užitočná a odhodlať sa ju zvládnuť a používať;
- Vyskúšať si praktiku, zistiť akú má hodnotu;
- Adaptovať ju do svojich podmienok;
- Fixovať jej používanie;
- Používať novú praktiku rutinne a zavŕšiť tak proces jej rozšírenia[10].

Existuje predpoklad, že systém Lessons Learned prispeje k rozvoju ozbrojených síl. Podobný systém je možné vytvoriť v ktorejkoľvek organizácii, či už súkromného alebo verejného sektora. Získaným efektom je sprístupnenie mnohých skúseností v systematickej a zrozumiteľnej forme všetkým potenciálnym užívateľom, čo by malo viesť k zdokonaleniu a zvýšeniu organizačného potenciálu.

LITERATÚRA

[1] BUREŠ, V. 2007. *Znalostní management a proces jeho zavádění.* Praha: Grada, 2007. 212 s. ISBN 978-80-247-1978-8.

[2] BURGER, I. 2010. Podnikový knowledge Management – konkurenčná výhoda. In *Manažér, roč. 15, 2010, č. 2.* ISSN 13-35-1729.

[3] COLLISON, CH. – PARCELL, G. 2005. *Knowledge management.* Brno: Computer Press, 2005. 236 s. ISBN 80-251-0760-4.

[4] DIAČIKOVÁ, A. 2010. Reálny manažment znalostí vo firemnej praxi. In *Zborník z II. ročníka vedeckej konferencie s medzinárodnou účasťou „Organizácia založená*

[9] PETRUFOVÁ, M. a kol.: Záverečná správa z riešenia vedeckého projektu „*Možnosti modelovania správania sa jednotlivcov a davu v krízových situáciách*“. ŠPP 852_08-RO02_RU21-240.

[10] BURGER, I. *Podnikový knowledge Management – konkurenčná výhoda*. 2010.

na vedomostiach v období globalizácie a internacionalizácie“. Poprad: Katolícka univerzita v Ružomberku, Pedagogická fakulta, 2010. ISBN 978-80-8084-586-5.
[5] PETRUFOVÁ, M. 2011. Strategický znalostný manažment, znalostná spoločnosť a znalostne orientovaná organizácia. In *Zborník z medzinárodnej konferencie AKS 2011: International conference army and knowledge society*“. Brno: Univerzita obrany, 2011. ISBN 978-80-7231-789-9.
[6] PETRUFOVÁ, M. a kol. 2011. *Záverečná správa o riešení vedeckého projektu ŠPP 852_08-RO02_ru21-240 „Možnosti modelovania správania sa jednotlivcov a davu v krízových situáciách*“. Liptovský Mikuláš: Akadémia ozbrojených síl gen. M. R. Štefánika, 2011. 55s.
[7] Smernice náčelníka GŠ OS SR o získavaní poznatkov a využívaní skúseností. ŠbO - 179-4/2011-OAD.
[8] STEJSKAL, J. 2001. Controlling – moderní nástroj dosahovaní cílů. Controllingové know-how z první ruky. In *Sborník managementu změn a reengineeringu“.* Praha: Computer Press, 2001. 515 s. ISBN 80-7226-428-1.
[9] VÁVRA, K. – ŠTANCL, L. 2011. Rozvoj ekonomiky obrany státu ve znalostní společnosti cestou k racionalizaci hospodaření. In *Economics and Management Ekonomika a management, roč.5, 2011, č.1.* ISSN 1802-3975.

Jaromir MARES

THE POSSIBILITIES OF EXPENCES REDUCING DURING TRANSPORTATION PROCEDURES

Abstract:
The submitted paper deals with the economic aspects of evaluation operation of the selected truck. The evaluation includes more significant parts of the life cycle of the truck. There are some aspects involving the economics of adding additives ENVIROX, its influence to reduce diesel consumption and mainly to reduce the environmental burden by produced exhaust gases.

INTRODUCTION

As it is well known, economic crisis has ever deeper and more tangible impact on individual countries in the world. Into the economical traps got progressively Greece, Ireland and Island, problems threaten Portugal and the economic situation of Spain and Italy is currently being discussed within the EU. The current state of development of society in the Czech Republic is also very complex. The present government has set themselves a target aimed at gradual reduction of public debt. Resorts rely on beneficial programs, projects and general scientific knowledge that will help solving the technical and economic problems. Therefore science is one area that is not to be extremely reduced; on the contrary proposals are expected to streamline the use of invested funds in this field.

Ministry of Defense is one resort which has to reduce significant amount of resources in present and future as well, therefore there is a focus on optimal use of resources. Military operations are also addressed due to cost. One of the ideas in the project is to find cost savings on fuel and reduce negative impact on the environment.

1 CURRENT STATUS OF PROBLEMS

The cost of operation of vehicles can be solved in several possible ways such as reducing costs of maintenance, reducing cost of required fuel, reducing costs of vehicle fleet modernization. Preserving environment is a necessity involving associated costs, to allow only limited number of pollutants. When evaluating the cost of cargo transport of ACR (Army of the Czech Republic) the problem ought to be seen from different perspective than that of civil transport company. ACR is not operating on the purpose of economic profit. [2, 3]

The present situation of cost savings is focused on the possibility of use of additives. Additives are substances added to other substances or mixtures in order to improve or modify their features for more beneficial use. Additives used in practice are for example food additives, from a technical point of view are important additives for paints, etc. Beneficial might be additives used in internal combustion engine systems, for both greases and fuels. Among the fuel additives for diesel engines are certain products whose long-term stress tests are not known, their effects are difficult to substantiate and they are often questionable, because the vendor only emphasizes small-scale effects, affecting the customer.

Survey found an additive under the trade name ENVIROX with outstanding features. Since 2009, its features have been studied in project OVOU FEM200902 of defense research, its technical, economic and environmental effects and benefits. ENVIROX [1] is chemical product based on oxide cerium (CeO_2), which acts as a catalyst when added to the fuel. Its influence on combustion processes is substantial reduction of harmful combustion gasses, unburned fuel and particulate matters in exhaust gasses. During the catalysis is used the naturally occurring element, cerium (Ce). The base of catalysis is presented by oxide cerium (CeO_2), which enables almost complete burning of hydrocarbons and soot.

Additive ENVIROX is designed for diesel engines and its features can: reduce fuel consumption; clean carbonated engine; reduce air pollution. The fuel consumption declares reduction of 5 to 11 %, for considerations in the paper [2] an average value of 8 % was used. Added to this knowledge of several years of experience in the use of vehicles in cities in both the Czech Republic and abroad contributed. [5], [7], [8].

2 PROBLEM ANALYSIS AND THE METHODS USED

2.1 EVALUATION OF VEHICLE OPERATION COSTS

Calculation formula applied to road transport is given by the table Tab. 2.7 [2]. There is a list of potential allocation of costs to dependent and fixed. Total costs (N_C) are expressed by the total sum see equations 3.1 a 3.2, where: b_1 is a rate of variable cost per km (in CZK/ per km), x_1 –independent variable indicating the performance in km driven, b_2 – independent variable indicating the performance in hours of operation.

$$N_C = N_{Z1} + N_{Z2} + N_f$$

(3.1)

$$N_C = b_1.x_1 + b_2.x_2 + N_f$$

(3.2)

For assessments in ACR a theoretical formula (3.3) can be deduced, expressing a cost of used vehicle or operation unit per km. The formula can be in an open form and in some extent subjective. It depends on who compiles it and for what purpose, see [2] (Tab. 2.8 and relation (2.50)). $\mathbf{N_{1}}$- purchasing cost of the vehicle and impact on the costs per 1 km; N_2 – the costs of buying spare parts; N_3- costs of technical maintenance TM 1; N_4-costs of technical maintenance TM 2; $\mathbf{N_5}$- costs of implementation of seasonal preparation form summer to winter use; $\mathbf{N_6}$ – costs of implementation of seasonal preparation from winter to summer use; $\mathbf{N_7}$ – driver salary-related costs; $\mathbf{N_8}$ **-** costs of fuel consumption; $\mathbf{N_9}$- costs of tires and tire services; $\mathbf{N_{10}}$- costs of batteries; $\mathbf{N_{11}}$- costs of technical inspection and emissions; $\mathbf{N_{12}}$ – cost of tolls; $\mathbf{N_{13}}$- other necessary expenses; $\mathbf{N_C}$ – total costs of use of the vehicle. Total costs of use of vehicles in [CZK km^{-1}]

$$\mathbf{N_C = N_1 + N_2 + N_3 + N_4 + N_5 + N_6 + N_7 + N_8 + N_9 + N_{10} + N_{11} + N_{12}}$$

(3.3)

Note: In terms of finding the costs of vehicle maintenance in missions (N3, N4) questionnaire methods, SWOT analysis and trend analysis were used [7].

2.2 ANALYSIS OF ENVIROX ADDITIVE FEATURES

CARBON OXIDATION HAPPENS IN DIESEL ENGINES. DURING THE COMBUSTION PROCESS A NUMBER OF UNDESIRABLE SUBSTANCES IS PRODUCED WHICH TOGETHER WITH THE MIST OF OIL CREATE CARBON. CARBON THEN ACCUMULATES IN COMBUSTION CHAMBER AND EXHAUST TRACK.

Nanoparticles of CeO_2 added to fuel enable better burning of hydrocarbon which creates fuel with a support of burning deposits. There is complete elimination of deposits from the combustion chamber. Characteristics of ENVIROX additive is stated in appendix [7]. According to the manufacturer, an additive ENVIROX with its catalytic features lowers fuel consumption by 5 to 11, 4 % and reduces pollutants in exhaust gasses by up to 14 %. The features of ENVIROX are given by the cerium compounds. It operates like an oxidation sponge due to its surface defects creating vacancies in fluoride crystal structure. Cerium oxide is the catalyst, which supplies oxygen to the combustion process and cleans combustion engine from carbon deposits.

ENVIROX additive function is visible in two levels. These are actual two mechanisms. ENVIROX cycle technology and catalytic oxidation are evident from the chemical equations (3.4) – (3.6).

Soot combustion

$$4CeO_2 + C_{(soot)} \quad \rightarrow \quad 2Ce_2O_3 + CO_2 \tag{3.4}$$

Combustion of hydrocarbons

$$4CeO_2 + CH_2 \;\; 2Ce_2O_3 + CO_2 + H_2O \tag{3.5}$$

Catalyst regeneration

$$2Ce_2O_3 + O_2 \leftrightarrow \quad 4CeO_2 \tag{3.6}$$

From structure view, the cerium oxide is a cube where one side is equal to 1 micron and the total area is 6 micron square.

Studies conducted at the University of Thessaloniki showed that the use of ENVIROX has a positive impact on air and soil. If recalculations would be carried out within the EU emissions by 2020- Concentration of cerium oxide would be calculated for two cases, ie, motorways and so-called canyon models, where the air quality does not change too quickly. Using additive ENVIROX will reduce the air pollution in 2020 by 85.000 tons at the cost of 75 tons of emitted oxide cerium, in case that the traps are used. [2]

2.3 EVALUATION OF EMISSIONS AND EMISSION FACTORS

To calculate emissions for ground military vehicles operated by the ACR were used some of the 17 categories monitored in defined methodology MESED. The calculation procedure is based on the patterns obtained in the literature [9], [10] [11]. The relation for the diesel heavy duty vehicles category (conventional, EURO1-4):

$$E^z_{C1X} = \sum_{x=1}^{3} s_{C1X} . \rho . Ef^z_{C1x}$$

(3.7)

where: X-represents the character of the EURO standard; S_{C1X} – fuel consumption for the category C_{1X} [dm^3]; ρ[$kg.dm^{-3}$] – density of diesel fuel; Ef^z_{C1X} - emission factor for selected pollutant from the category C_{1X} [$g.kg^{-1}$], E^z_{C1X} – emission amount of pollutants into the air by operation of the military ground vehicles from the category C_{1X} [$g.year^{-1}$].

3 EXAMINED ISSUES

The design part applies to results obtained by monitoring the costs of vehicle T 815 6x6 operation, to other possibilities of reducing costs of vehicle operation by using ENVIROX additives and applies to monitoring the environmental burden or possible compliance of imposed limits for some exhaust gas components.

3.1 ECONOMIC EVALUATION OF THE COST OF OPERATING VEHICLES

In real traffic supply process in ACR are, used all versions of vehicle T 815, vehicles Praga PV3S, T 810, their special versions and others. The vehicle T 815 6x6 was selected as a sample for economic evaluation. According to ISL represents the largest group of vehicles in ACR. Total costs of used vehicles T 815 6x6 is in table 4.1:

No	Expense designation item	Designation of expenses [Czk km^{-1}]
1	purchasing cost of the vehicle and impact on the costs per 1 km	**N_1= 15,07**
2	costs of buying spare parts	**N_2 = 4,29**
3	costs of technical maintenance TM 1	**N_3= 4,18**
4	costs of technical maintenance TM 2	**N_4= 3,14**
5	costs of implementation of seasonal preparation form summer to winter use	**N_5= 2,24**
6	costs of implementation of seasonal preparation from winter to summer use	**N_6= 2,24**
7	driver salary-related costs	**N_7= 82,29**
8	costs of fuel consumption F-54	**N_8= 14,76**
9	costs of tires and tire services	**N_9= 15,56**
10	costs of batteries	**N_{10}= 0,51**
11	costs of technical inspection and emissions	**N_{11}= 0,57**
12	cost of tolls	**N_{12}= 0,00**
TOTAL	total costs of use of the truck T 815 6x6	**N_C = 144,85**

Table 4.1 Tabled formula for expenses of T 815 in life cycle

For clarity of all involved costs a table formula [2] is created. It shows individual and total costs per km of vehicle operation. Considering that the each vehicle Tatra 815 ran during the year various amount of km, a table was compiled Tab. 4.4 [2]. For instance, there are possible to find annual cost of fuel consumption (**N_8**) or cost of maintenance and repairs (**N_2+ N_3+N_4+N_5+N_6 +N_{11})** or total costs (**N_C).**

3.2 OTHER WAYS TO REDUCE THE COSTS OF VEHICLE OPERATION – ENVIROX ADDITIVE

The seven surveyed companies of logistics (collected data and afterwards calculations were performed and gathered in the result tables [2]. For clarity the costs of possible diesel savings are calculated for each company. Based on the results a calculation was performed for individual vehicles in the corresponding year and the total sum in the whole company. The result is overall reduction of diesel in given year and quantification of considered cost saving. The quantification is shown in table [2].

3.3 SECONDARY EFFECTS OF TRANSPORT SUPPLY PROCESS AND ITS CONSEQUENCES

As mentioned above, only those components of exhaust gases were monitored, which can be expressed numerically. By use of methodology MESED and equation (3.7) were calculated three emission components as CO, CO2, NOX. The components were denominated for individual years at the seven monitored logistics companies, see [2], the results are arranged in Tab.4.2.

CONCLUSIONS

As results of vehicle operations, observed group of vehicles at the logistic companies were vehicles using diesel fuel only. These are mainly workshops for wheeled vehicles, cranes, low loaders trucks with T 815, Tatra T 815 versions 4×4, 6×6, 8×8, vehicles Praga PV3S, T 810, buses and some others.

The average value of all vehicles is 2681 km/year. The average value of Tatra T 815 vehicles is 3 500 km per year and this value is also used for the theoretical calculations stated above.

The low number of traveled kilometers shows that some of the operational costs are issued unnecessarily.

If a modularization system were introduced, it would reduce number of used vehicles and lower the number of drivers and therefore reduce the salary costs. This will reduce the number of unused equipment- it will avoid aging of vehicles and associated costs. Fewer drivers will increase competition and allow use of only the best.

It will reduce the cost of unnecessarily performed annual maintenance of vehicles. The average mileage per year for used vehicles will increase. Utilization of drivers should be at least 20,000 km per year.

The system would also involve disadvantages, such as earlier general repairs of vehicles or non loaded trucks on long distances.

Based on use of additive ENVIROX following conclusions were made:
Total fuel saving was 116 454 liters of F-54 on all of the observed logistics units from 2006 – 2009 (four years). The total savings in CZK at the price of diesel from year 2009 were than 2 864 780,7 CZK. Cost of additive ENVIROX TM was 110 631,8 CZK.

Evaluation of fuel savings done of engine operated and loaded under laboratory conditions confirmed reduction of fuel consumption to the extent of only 2,5 % compared to expectations, mainly due to use of old worn-out engine.

The contribution of the POV evaluation project is that the ENVIROX additive does not harm the operated device (engines chambers).

In economic terms the cost of purchased additives cannot be ignored. That is the price of one liter F-54 increases by 3800/4000 = 0,95 CZK. In year 2009 the purchase price of 1 liter F-54 for ACR was 24,60 CZK [12], thus the price of fuel has increased by an purchasing item of additive, new rate was 25,55 CZK.

Based on the price of additive ENVIROX, calculation was established. The fuel reduction must be at least 3,9 % F-54, otherwise the operation is unprofitable. It is necessary to include other indicators such as transport costs of additive and especially additive dosing plant and its cost.

In order to make the use of additives profitable, the fuel consumption with additive ENVIROX would have to be reduced by at least 5 % F-54. By monitoring and analyzing potential emission load it is obvious that:

Vehicles from other companies, tracked or wheeled heavy armored vehicles are not involved in production of pollutants.

Calculated values of produced pollutants CO, CO_2, NO_x are stated in tables [2] and Tab. 4.3. It is obvious from the results of individual pollutant calculations that the quantity produced is relatively high.

In this article is considered reduction of combustion gas by use of additive ENVIROX. Reduction of fuel consumption was 8 %, as well as reduction of pollutants in given ratio table 4.2.

Results showed lower emission level, which is evaluated as positive influence on environment.

Bibliography references

[1] MAREŠ, J. at all. The project “ENVIROX”, Annual report 2010, Brno, 2010, p. 100.

[2] MAREŠ, J. *The effectiveness evaluation of selected transport supply areas in ACR*. [Habilitation thesis] Brno: Publishing house UD, 2011, pp. 253.

[3] BOZEK, F., MARES, J., BOZEK, M. and HUZLIK, J. Emission of Particulate Matter While Applying the Envirox^{TM} Additive. In Proceedings The 5th WSEAA International Conference on Waste Management, Water Pollution, Air Pollution, Indoor Climate. Iasi, Romania: WIT Press, 2011. P 170 - 175. ISBN 978-1-61804-012-1.

[4] BOZEK, F., MARES, J., GAVENDOVA, H. and HUZLIK, J. Emission of Selected Gas Pollutants at the Application of Additive Envirox^{TM} In Proceedings The 19th WESSEX International Conference on Modeling, Monitoring and Management of Air Pollution. Ramla Bay Resort, Malta: WIT Press, 2011. P. 6. [In Print].

[5] ATTFIELD, M. Envirox Fuel-Borne Catalyst. [Presentation] Oxford: Energenics, 2009. 49 p.

[6] Aditivum pro diesel motory, čištění motoru pomocí aditiva, dostupné na: http://www.axa-oleje.cz/stp-aditivum-pro-cisteni-motoru.

[7] ATTFIELD, M. TERRY, B. Presentation at the seminar users of additives ENVIROX. Oxford, 2010, sl. 46.

[8] WAKEFIELD, G., WU, X., GARDENER, M., PARK, B. and ANDERSON, S. Envirox TM fuel-borne catalyst: Developing and launching a nano-fuel additive. In Technology Analysis & Strategic Management. Vol. 20, No 1, January 2008, p. 127-136. ISSN 09553-7325.

[9] GAVENDOVA, Hana. Emisní zátěž z mobilních zdrojů v resortu obrany. [Doktorská disertační práce]. Brno: Univerzita obrany, 2011, s. 146.

[10] DUFEK, J. Metodika stanovení emisí látek znečišťujících ovzduší z dopravy. Brno : CDV, 2000, str. 35-38. ISBN 80-86502-33-3.

[11] GAVENDOVA, Hana, BUMBOVA, Alena. Emissions from the MilitaryVehicles. In Lecture Notes on Energy and Environment. Arcachon : WSEAS, 2007, p. 244-247. ISBN 978-960-6766-09-1.

[12] Správa státních hmotných rezerv. Cenová specifikace paliva, oznámení číslo2 / 2009 o lnění MO. Praha 2009, s. 1.

Logistics Company (RL)	Total fuel savings in years 2006-09 [l]	Total financial savings [CZK]
71. mpr Hranice	19 831,6	487 855,3
72. mpr Přáslavice	11 326,1	278 621,6
73. mpr Přáslavice	17 834,4	438 726,3
41. mpr Žatec	22 006,2	541 351,6
42. mpr Tábor	15 259,1	375 374,4
43. vpr Chrudim	13 853,4	340 623,4
141. zaspr Pardubice	16 343,7	402 052,6

Table 4.2 Quantified fuel savings and financial costs by companies

RL	CO [kg]	CO_2 [kg]	NO_X[kg]
2006	58 735,39	1 020 110,85	25 842,39
2007	50 523,71	936 661,29	22 468,62
2008	48 755,87	898 498,59	21 429,06
2009	36 301,79	958 540,17	16 942,78
Total	194 316,76	3 813 810,90	86 682,85
Decrease by 8%	178 171,42	3 508 706,10	79 748,29
8%	15 545,36	305 104,80	6 934,56

Table 4.3 Quantified fuel savings and financial costs by companies

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CONTEMPORARY CONSIDERATION AND NATIONAL SECURITY SYSTEMS REENGINEERING

Abstract:
The complication and complexity of modern threats require a contemporary consideration/action. At the forefront of the contemporary consideration/action there is the consideration of probability, insecurity, and the consideration of the whole without deterministic simplifications, the approach with a comprehensive interdependence and a procedural thinking, which requires extensive knowledge, contacts and influences and their interlacement the aim of which is to finally be able to achieve with reasonable simplification the sufficient and requisite holism and creative collaboration or multidisciplinarity. One of the solutions is an operation and action united in the term reengineering. Contemporary threats, namely the demand, change now, the awareness needs to say what to do, knowledge must give us the answers on how we will make the changes, and values must separate what is important from what is unimportant.

INTRODUCTION

Knowledge, teamwork, dedication to the mission of the system are the guidelines that must be at the forefront in the development of the national security system and the development of subjects of national security.

We repeatedly hear how our national security system is still underdeveloped and how it must be upgraded. Actually, it is a constant of regulatory, organizational, and logistical inconsistencies; we can also write down delays between real needs of the national security structure and the current organization, which is a cross section of the needs organization of a certain political elite at a given moment. Unfortunately, the dynamics of events and a relatively low interest of the political elites in the holistic development of the national security organization produced such gaps between the reality of the needs and the national security system that reengineering is needed also in the organizational sense.

1 REENGINEERING OF A COMPREHENSIVE AND RADICAL CHANGE

The reengineering of an organization (hereinafter summarized from the Villa in Kovač [8]) and the consideration on this approach have come to the fore only after 1993, when they were launched among theorists and practitioners by Hamer and Champy [5].
The authors namely believe that it is necessary to simply efface, abolish the old organization and its principles and start all over again. This should be done:
- Thoroughly – we need to ask ourselves, why we do what we do, and why we do it this way;
- Radically – we shall not repair and patch the old, but we have to start anew;
- Dramatically – this means a magnificent jump and not an insignificant progress. Replace and improve everything by 100% and not only by 10%.

Reengineering of an organization is not satisfied with the answer to the question "How can I work better, faster, cheaper" , but it raises the question "Why are we doing it the way we do". Such questions lead us to the reflection on the necessity of certain processes.

As O'Neil and Sohal [10] note, at the beginning of the nineties of the last century [4, 2, 5] the term Business Process Reengineering - BPR was established as the process management role (direction of the processes) to enforce a competitive advantage of an organization. In the process, Davenport and Short [5] describe BPR as an analysis and planning of work flows and processes both within the organization and among organizations. In order to achieve dramatic improvements in the modern criteria of an organization success (cost, quality, service, and velocity), some advocate a change in the foundation of consideration and radical transformation of business processes within and between organizations [5]. Still others [16] focus on reconsideration, process restructuring and formation of business structures, work methods, management systems and external relationships through which the value of the organization is created and sold. However, Petrozzo and Stepper [13] opine that BPR involves on-going transformation of processes, organizations and their supporting information systems in order to achieve radical improvements in the criteria such as time, cost, quality and the attitude of the customers toward products and services of an organization.

2 THE NATIONAL SECURITY SYSTEM OF THE REPUBLIC OF SLOVENIA

The National Security Policy of the Republic of Slovenia is a balanced totality of a vision, strategies, programs, plans and activities of the State, necessary for the response to the sources of threats and risks to its national security and thus to achieve its national security objectives aimed at protecting the Slovenian national interests.

The Republic of Slovenia will develop mechanisms to enhance the overall safety culture, which is based on awareness, prevention, tolerance, solidarity, cooperation and mutual aid among people and on the culture of peace and nonviolence in ensuring security.

Dynamic changes of the modern security environment and the complexity of security threats and risks require the organizational integration of individual departmental policies relevant in terms of ensuring the national security into a consistent whole and organizational flexibility and adaptability to the national security system and its subsystems. This is the only way to ensure a consistent and timely response of the State to a full range of contemporary sources of threat and risk to the national security [14].
Contemporary sources of threats to our environment are unclear and unrecognisable and require measured solutions in real time. Unfortunately, most of the times it happens that in the current organizational structure of the national security system none of the subjects of the national security identifies itself as the owner and rescuer of the problem. The prolonged coordination and adjustment are necessary, which, however, always mean an additional delay in rescuing, which may create unpredictable situations and uncertainty.

The threats are complicated and require specialized knowledge for specific solutions. Relations between different threats show the complexity of the phenomenon, which requires multidisciplinary approaches. A practical question of a common action and efficiency of a specialist in complex multi-disciplinary teams is raised.

With the development of science and technology their role in shaping the national security is increasing, which can be seen as a strategic advantage by Hermann [6]. The same author notes that this technology rises from the globalised industrial base, which is also the foundation of a commercial and economic success. Rightly, the desire for secrecy and control over the technology needed to form the capacity of the national security is at the same time in conflict with today's globalisation guidelines and the open market.

Furthermore, the legal regulation of the national security system shows a discontinuity, fragmentation of the system, a prestigious battle for the jurisdiction over the management and better positions of the individual subsystems during crises. It clearly shows the need for a coordination or adjustment of the crisis rescue players in the determination of those responsible for and participating in each crisis situation. To put it simply, the owner and the participants in solving the problem are rarely identified immediately at the emergence of a crisis. This means the loss of valuable time and resources in emergency situations.

What is described above cause crises to become momentary and unforeseen events and actions that threaten the lives of people or the organization's viability.

Crises are now a part of everyday life of every organization. As noted by Tsang [17], the crisis can strike upon any organization devoid of any warning. Situations dominated by the stress and sudden changes namely cannot be solved by usual routine processes. Although the preventive work is very important, somewhere this simply cannot be avoided.

The emergence of the crisis in an organization requires a careful, swift and decisive action. Since there are many types of crises and a variety of reasons for their occurrence, it is important to plan for the crisis situations very carefully. In theory, there are many strategies on how to plan for the crisis, how to behave in it and what the practices of the organizations in the post-crisis stage are. In practice, things are unfolding more quickly and so the preparedness of the organization is especially important.

In the professional literature, there is a large degree of the consensus on the definition of crisis. The organizational crisis can be defined as an event of a low probability and high impact, which due to great uncertainty and time pressure undermines the ability of the organization. This event is characterized by an ambiguity of the crisis cause of, consequences and means to solve the originated situation, as well as the belief that decisions must be taken quickly [12, 3].

The strategic context of crisis management should not be viewed as a tactical reaction response to the situation, by Jacques [17], but also as proactive and disciplined interrelated processes, which include the prevention of crises, crisis preparedness, response to the crisis and last but not least, recovery from the crisis. Although the term Disaster management is sometimes used incorrectly as a synonym for Crisis management, the management of a number of accidents is yet characterized by the integration process of government agencies and other bodies.

As noted by Tsang [17], the majority of military strategies that are now used in the business world were taken over from the ancient wisdom and doctrines of manoeuvring armies during the Second World War. An example is the doctrine $C^3$1, which originates from Russia and was adopted by many armies around the world. In order to organise an effective military operation, the armies in modern times must namely reconcile all four elements of this doctrine: command, control, communications and intelligence.

Crisis communication must ensure that the information will reach every individual in all the important moments in time and in a measured way. Every individual and organization must have in the first place a built-up confidence that they will have such information at their disposal and that based on it, they will act correctly. The transmission and reception of data should exclude noise in both the technical and even more in personal terms, both quantitatively and qualitatively.

Crisis communication is an important, but not the only part of crisis management [7]. Tsang [17] in the case of $C^3$1 doctrine points out the importance of the effective communication element, which is a two-way communication between the commander and soldiers on the ground. Since in the crisis management in an organization the reactions of various stakeholders (or interest groups) and the media may exacerbate the crisis, it must also be the goal of an effective communication to ensure to these groups timely and accurate information on the crisis. This is the only way to establish the positions of supportive nature. The in-depth analysis of case studies showed [9] that the crisis communication plans are only one part of the practice of excellent public relations in the times of crisis. Thus, the quality of a crisis communication is affected by many factors in the model of public relations in the times of crisis (the impact of the informing organizational culture of informing on communication activities and programs during the crisis, on pre-crisis, crisis, post-crisis relationships with appropriate public, and communicational autonomy of PR staff).

In sum, everyone who needs it must have an access to the right information regardless of the time, place, situation in which he is, and his state of data perception. Of course, this necessarily describes an ideal situation, which we have to build as a model from the personal to all higher organizational levels. Each individual is required to do their best to contribute to an appropriate communication and information, so that he truly contributes to a successful solution of threats.

3 PUBLIC PRIVATE PARTNERSHIP AND THE NATIONAL SECURITY SYSTEM

Public-private partnership is a relationship involving private investment in public projects and/or public co-financing of private projects that are in the public interest, and such relationship is formed between public and private partners in connection with the construction, maintenance and operation of public infrastructure or other projects that are in the public interest, and in connection with the associated provision of commercial and other public services or activities provided in a way and under the conditions applicable to commercial public services, or of other activities where their provision is in the public interest, or of other investments of private or private and public funds in the construction of structures and facilities that are in part or entirely in the public interest, or in activities where their provision is in the public interest (Article 2 of PPPA OG RS, no. 27/2006 [18]).

Public Private Partnership - PPP is aimed at strengthening and promoting the private markets under the criteria of public interest of the State [11]. In doing so, private capital and private sector companies finance and manage the infrastructure, which was previously funded and managed by public funds. In recent years, public-private partnerships have become popular in many countries. Governments want to reduce government spending and public borrowing, and they are aware that private companies may perform these services at a lower price, thus they are introducing a public-private partnership to replace direct state investments.

As noted by Spackman [15], the projects financed by the private sector are the main mechanism to expand the role of the private sector in the provision of public services. Such private financing, inter alia, enables better contract identification and management and innovation designing. At the strategic level, it extends the transparency of public procurements and effectively obliges performers to a long-term cooperation.

Besley and Ghatak [1], who verified the importance of the care in relation to public service as means between the parties in the public-private partnership, note that the party in the partnership, which cares more for public services, regardless of the amount of invested efforts to implement these services, should have the equity control.

Parker [11] concludes that the caution is required when dealing with public-private partnerships and that such partnerships do not necessarily lead to improved economic efficiency in public procurements in the defence field. Much attention should be paid to negotiations in developing public-private partnerships, to monitoring their results and their renewal. Examples from abroad (e.g. the UK defence sector) suggest that public-private partnerships are also associated with high transaction costs to help prevent the potential benefits in terms of economic incentives to efficiency. This finding is crucial to the defence sector, as well as in general for all public-private partnerships with a certain type of uncertainty. In this regard, Parker (ibid.) points out that the costs and benefits of public-private partnerships must be carefully balanced with the costs and benefits of more traditional forms of public procurements in the public sector.

Example: with the abolition of the police administrations in some parts of Slovenia, a large resistance and the perception of citizens that the Slovenian police presence in the area will be too small and will not provide sufficient security to citizens is observed.

Slovenian police is establishing police offices in certain towns, but they do not function effectively, because due to a massive fluctuation the work is carried out by officers who do not identify themselves with the problems at the micro level.

The responsibility for the supervision and development of the private security in Slovenia is in the hands of the Slovenian Police. Furthermore, the ration between the Slovenian police and the private security in a numerical sense should change in favour of the private security. The solution for the described problem may be in the following.

Mini Police Station introduced in Detroit in Michigan State is based on the recognition that smaller police units deal with security problems of a certain community much easier and more effectively. It is a decentralized police system, where only one police officer is employed per police unit. The model is based on two concepts:

- The police officers and their ability to identify specific criminal phenomena are known by the people in the community;
- A constructive involvement of volunteers in the implementation of the programme and the possibility to contribute to the content.

A police officer, who works at a mini police station, has complete freedom both in the organization and in the mode of operation. A police officer has to find premises on his own and provide a self-imposed contribution for equipment. This compels him to get in touch with people; the people in the neighbourhood, who have contributed in equipping the premises, on the other hand, have a deeper sense for the work results of the stated police officer. The introduction of mini police stations has increased the popularity of both the police and the flow of information.

In Slovenian territory, based on the public private partnership, Slovenian police could place mixed teams of police officers and private guards, who would be selected through a public tender. Such teams would have the power of preventive policing and solving simple security problems. Above all, in individual environments they would restore a greater perception of safety in citizens.

In the field of civil protection and disaster relief on the other hand, we are faced with two concepts of disaster relief, which on various occasions are in the conflict that sometimes also means a delay or requires coordination.

This is a very well-developed voluntariness, e.g. Slovenian Fire Service, mountain rescue teams, etc. Volunteers are often even the primary rescue carriers. Their motivation and skills often border on the enviable professionalism.

Still complex threats and security events require the knowledge that can be provided only by professional officers and professional skills (e.g. CBRN field - chemical, biological, radiological, nuclear defence). However, motivation and resources for establishing such professional organizations are not at the appropriate level.

In the future, the public private partnership could focus the motivation and knowledge of volunteers into the foundation of a larger number of professional public-private companies (maybe even after the model of social entrepreneurship), which would give us adequate forces to tackle the most demanding situations in real time with knowledge.

4 COMPREHENSIVELY AND THOROUGHLY ONWARD

The contemporary security environment is confronting us daily with challenges of new threats that are unrecognisable, and are rapidly changing, and complex. These threats, which are far from conventional military threats, frequently escalate into a crisis that traditional organizations, such as the army, police, intelligence services, justice, civil protection and disaster relief with current powers do not recognise as their own, and therefore, they are not addressing them (e.g. radiological, chemical, nuclear terrorism in all its versions).

The difference between the perception of the crisis and its reality, not adopting the crisis as their own, and legal impediments to taking initiatives for its resolution, mean a loss of valuable time and money. When those responsible ones do finally deal with the problem of the crisis, they each lack the competence, skills or equipment (e.g. the military has protective masks, the police do not have them even though they are the first to go into action, etc.).

We, therefore, believe that Slovenia does not need the conventional army and conventional police, traditional intelligence, security activities, and traditional diplomatic activities, conventional voluntary civil protection and disaster relief. The army and police should be disbanded by classical bankruptcy (some have successfully done this).

It is necessary to establish a joint force that in theory is known as a paramilitary force, which is capable of performing the present tasks of the army, police and civil protection and disaster relief under a unified command.

The surplus of people goes to private security companies, a small number goes for guards in prisons, others to the free labour market and such like.

The diplomacy changes from traditional diplomatic missions into a flying mobile diplomacy from Ljubljana or some centres.

The intelligence and security services would be united under one roof and kept at the third of the current size.

Some incentives for changes, such as e.g. the initiative for the abolition of the Slovenian Armed Force of the magazine Mladina, are already present in the Slovenian territory.
Today in the Ministry of Defence, the Slovenian Armed Forces, Civil Protection and Disaster Relief forces, the Ministry of Internal Affairs and the Slovenian police, the Ministry of Foreign Affairs and our diplomacy, the Ministry of Justice and its Prison administration and intelligence services operate a total of about 21.500 employed public servants. They spend 1.350 billion EUR from the budget on an annual basis for its operation, including salaries.

When a non-transparent threat that may never develop into a crisis turns up, this huge machine is operating in an uncoordinated way. In most cases, it spends a lot of time to determine which of them will be responsible to solve the problem and who will be participating in it.

An example of this are the last floods in Ljubljana, which were tackled by several hundreds of volunteer fire-fighters that left their jobs in Prekmurje and came to help the people of Ljubljana; meanwhile there were thousands of unused professional soldiers in Ljubljana, who were paid to observe the volunteer fire-fighters. In sum, the irrational nonsense, where at one end we take the labour force from the manufacture, which is suffering damage, and place it at the other end of Slovenia, where we already have paid soldiers, who are competent, but not used. It is a double loss of income or irrational use of resources.

To address the crisis, a rapid and measured response is needed, and it must be clear immediately, who is the owner of the problem solution.

Our thinking about reengineering, which is a comprehensive and radical change of the above-listed subjects of the national security system, is moving towards greater integration of all and greater efficiency. We believe that by strengthening the integration and better training it is possible to reduce this multitude of 21.500 public servants to 12.000 professionals and the resources from 1.350 billion to 750 million EUR.

We will gain a national security force that will be the owner and rescuer of all the non-transparent threats and problems in every moment. At the same time, we will get about 11.000 people with solid multi-disciplinary skills on the free labour market, and we will have the remaining 750 million EUR available for them. If we use part of it for their reintegration in other areas of the labour market, we still have at least 400 million for the development of new technologies and other development opportunities.

This is, in short words, reengineering - that is a radical change in the system of national security, which will undoubtedly occur in the coming years; reengineering in terms of normative, organizational and logistical regulation.

CONCLUSION

Thinking about the thorough and comprehensive changes in our national security system is intended to encourage a discussion. It also shows that it is necessary to start to lay off employees from the state administration as well and find more effective roles for the redundant civil servants in the society. This is the only way to achieve a breakthrough into a new cycle of development of Slovenian society. In present conditions, the gap between the understanding of the public administration and the profit sector is too wide.
To address the crisis, a measured response is needed, and it must be clear immediately who is the owner of the problem and the searcher of the solutions. A key question on our willingness for reengineering is raised. Security threats require changes in the operation and organization NOW. The awareness of this content and issue should give us answers on WHAT to do. Knowledge and research should provide solutions or give answers on HOW TO realise this.

Values must separate the important issues from unimportant ones and show where to focus the efforts in the future. The willingness to reflect on the comprehensive and thorough changes is undoubtedly the elementary basis for the first steps and start.

Bibliography references:

[1] BESLEY, T., GHATAK, M. (2001). Government versus private ownership of public goods. *The Quarterly Journal of Economics, 116*(4), 2001, pp. 1343–1372.

[2] DAVENPORT, T.H., SHORT, J.E. The new industrial engineering: Information technology and business process redesign. *Sloan Management Review, 31*(4), 1990, pp. 11–27.

[3] GREGORY, A. Communication dimensions of the UK foot and mouth disease crisis 2001. *Journal of Public Affairs, 5*, 2005, pp. 312–328.

[4] HAMMER, M. Reengineering work: Don't automate, obliterate. *Harvard Business Review*, July/August, 1990, pp. 104–112.

[5] HAMMER, M., CHAMPY, J. *Reengineering the Corporation: A Manifesto for Business Revolution*. New York : Harper Business. 1993.

[6] HERMANN, R.J. National security challenges and competition: US defense and space. *Technology in Society, 30*(3-4), 2008, pp. 371–381.

[7] JAQUESE, T. Issue management and crisis management: An integrated, non-linear, relational construct. *Public Relations Review, 33*(2), 2007, pp. 147–157.

[8] KOVAČ, J., VILA, A. Sodobne oblike in pristopi pri orgniziranju: Moderna organizacija Kranj. 2009, 21.

[9] MARRA, F.J. Crisis Communication Plans: Poor Predictors of Excellent Crisis Public Relations. *Public Relations Review, 24*(4), 1998, pp. 461–474.

[10] O'NEIL, P., SOHAL, A.S. Business Process Reengineering: A review of recent literature. *Technovation, 19* (9), 1999, pp. 571–581.

[11] PARKER, D., HARTLEY, K. Transaction costs, relational contracting and public private partnerships: a case study of UK defence. *Journal of Purchasing and Supply Management, 9*(3), 2003, pp. 97–108.

[12] PEARSON, C. M., CLAIR, J. A. Reframing crisis management. *Academy of Management Review, 32*(1), 1998, pp. 59–76.

[13] PETROZZO, D.P., Stepper, J.C. *Successful Reengineering.* New York : Van Nostrand Reinhold. 1994.

[14] Resolucija o strategiji nacionalne varnosti Republike Slovenije, Državni zbor, URL 27/2010.

[15] SPACKMAN, M. Public–private partnerships: lessons from the British approach. *Economic Systems, 26*(3), 2002, pp. 283–301.

[16] TALWAR, R. Business re-engineering — A strategy-driven approach. *Long Range Planning, 26*(6), 1993, pp. 22–40.

[17] TSANG, A.S.L. Military Doctrine in Crisis Management: Three Beverage Contamination Cases. *Business Horizons, 43*(5), 2000, pp. 65–73.

[18] Zakon o javno zasebnem partnerstvu, Državni zbor RS, URL 127/2006.

Zdzisław POLCIKIEWICZ

THE CHARACTER OF PRESENT AND FUTURE OPERATIONS

Abstract:
The article includes analyses and evaluations connected to the character of present and future military operations based on combat lessons from military conflicts, which took place at the end of the last century and at the beginning of the present one. The author has identified main periods of the military operations development on the background of the contemporary art of war and assessed their predicted character, also of those which resulted from the net centric operations environment. Presented concepts may support the assessment of required directions of the national armed forces transformation as well as other NATO armed forces, in the aspect of allied operations.

INTRODUCTION

The issues connected to the future operations character are still an important subject of many military theorists and practicians' researches. They entirely agree that the character is determined by many different factors, from which one of the most important is the state of international relations. According to that the military operations are classified as war, crisis and peace operations[1]. It is necessary to point out that the war operations generate the most difficult environmental conditions for armed forces, so in further considerations the main attention will be focused on them.
The war operations result from direct threats or expansion politics led towards countries or other legal subjects in the international area. Among direct threats there are still present traditional delay, defensive and offensive operations, whose main object is maintaining independency and territories of an own or allied country.

1 MAIN STAGES OF MILITARY OPERATIONS DEVELOPMENT

In the contemporary art of war one may find three main stages of the operations development. The first stage was typical for the First and Second World Wars and had lasted until the eighties of the last century. The operation character had resulted from assumptions connected to a global conflict. Operations were conducted independently by main military branches in their own environments.

In the second stage, at the beginning of the eighties, a conception of an air-land operation was created. It rejected the idea of a massing force and introduced a combination of land and air activities under one command and common enemy engagement using different military branches (air force, army, navy). It required a strict integration of activities both in national and allied structures. It is important to notice, that the integration of different military branches and activities creates the concept of joined operations. Hence since the middle eighties of the XX century there has been existing a new term – Joint Operations.[2] Many military theorists don't treat joint

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[1] A. Czupryński, *Kampania i operacja – próba systematyki pojęć*, (w:) *Charakter przyszłych operacji,* materiały z konferencji naukowej, AON, Warszawa 2004, p. 112.
[2] Joint operation – an operation which is conducted by elements of at least two military branches. See: *Słownik terminów i definicji NATO (AAP-6),* wyd. grudzień 2006, p. 203.

operation as a new kind or form of operations, but as a demand of present-day combat activities which naturally comprise operations of different military branches[3]. The essence of a joint operation is an integration of efforts of all employed components to attain required objects while minimizing costs. The characteristic feature of the operation is striving after the information superiority and elimination by precision fire those elements which are decisive for the enemy to continue his activities. The engaged elements don't have to belong to armed forces, these can be the objects of infrastructure as well.

The air-land operation idea had initiated the third period of the military operations development. Nowadays the conception of a decisive operation is implemented, which doesn't assume the physical elimination of the enemy, but destroying the key elements which determine his possibility of the operations continuation. The selective engagement of the most important objects may be the direct basis of bringing the conflict to an end.

It is necessary to point out that air-land and decisive operations are described as multidimensional operations.

2 ANTICIPATED NATURE OF CONTEMPORARY OPERATIONS

The conclusions from wars and military conflicts indicate that present and future operations will not be characterized only by the complexity of activities of different military branches and services. The present day combat field, due to its multidimensionality, is more often named as a "battle space". According to many heading military theorists, the conflict in The Persian Gulf in 1991 started a new era of wars in which weapon systems based on the newest technologies were applied[4]. The subsequent combat operations, between them mainly the operation Iraqi Freedom in 2003, had confirmed that hypothesis. The weapon technology continuous development caused operations moving from hitherto existing three dimensions of combat (land, air, sea) to new spaces, such as cybernetic, electromagnetic or cosmic ones. In these "unnatural" spheres the tools of fight with intelligential features, which will enhance the activities tempo and precision, will be more frequently applied.

The cybernetic space (cyberspace) results from the informatics and information operational systems and electronics technology development[5]. The attacks in this area tend to informatics systems destroying or disturbance as well as a direct influence on the electronic subassemblies. Regrettably there exists a risk of breaking into informatics systems and nets with the aim of periodical or permanent interruption, for example with introducing viruses. The engagement in this space may bring the enemy to systems monitoring and controlling. Furthermore information manipulations and errors production in data bases or stealing valid and introducing false information are achievable. Hence the new military services – informatics forces – are being created. The conception of establishing such forces in Polish Armed Forces has also arisen[6]. The informatics forces will be designated for offensive and defensive (preventing

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[3] M. Wiatr, *Operacje połączone,* Wydawnictwo Adam Marszałek, Toruń 2006, p. 25.
[4] *„Military Intelligence"* nr 5/1992, p. 6–11.
[5] G. Rattaray, *Wojna strategiczna w cyberprzestrzeni,* Wyd. Naukowo-Techniczne, Warszawa 2004, s. 31.
[6] *Wizja Sił Zbrojnych RP 2030,* Departament Transformacji MON, Warszawa 2007, s. 21.

and securing) operations executed in an information area, in order to achieve an information domination. One of their main tasks will be the command and communication systems protection against the net threats, as well as the potential enemy's systems penetration[7].

The new area of operations is the electromagnetic space[8]. In the future it will be possible to create electromagnetic barriers, the crossing of which will be causing injuries of personnel and a combat equipment destruction.

One of the multidimensional area determinants is also an outer space, in which the supremacy may be achieved by some richest countries[9]. The cosmic dimension of operations had stopped to be only a scientific fantasy invention a long time ago. It is a fact now as well as the space armaments. Many countries have launched their satellite systems, for instance communication, intelligence, navigation or meteorology into the Earth's surrounding space which are designated also for military objects,. There exists a large probability that in the close future they will be able to engage objects in the outer space or on the Earth.

The combat experience indicates that operations are conducted in all dimensions as well as in many directions and in entire area width and depth. Renouncing the linear combat field conception and striving to nonlinearity caused the further obliteration of the differences between deep, direct and rear areas of operations.

One of essential conclusions from the Iraqi war is the change of operation area delimitation procedures. The units more often will not possess common boundaries in the operational area[10]. Such partition enables to concentrate the main effort in the areas, which are crucial from the own forces operation point of view. Moreover the forces large dispersion makes them less susceptible to enemy's strikes, first of all a mass weapon engagement, the use of which is still very probable. However this solution makes the force commander responsible for non delimitated elements of the operational combat order. Hence the commander must have to his disposal the necessary forces and means to control the area not occupied by subordinated units. In addition it brings the necessity of authority decentralization. Such solutions are applied in the Polish Armed Forces (SZ RP) training, for instance during the GRANICA 06 exercise (figure 1)[11].

[7] Simultaneously with computerization development the risk of breaking into informatics systems increases. According to the Pentagon administration in 2005 were noted 79 thousand of unauthorized tries of getting access into the US defense system. Approximately 13 thousand were probably successful. The attacks were directed among other things into computer nets of the 101st Army Airborne (Air Assault) Division and 82nd Army Airborne Division. J. Czermiński, *Niedoceniona broń,* „Polska Zbrojna" nr 16 (587)/2008, s. 25.

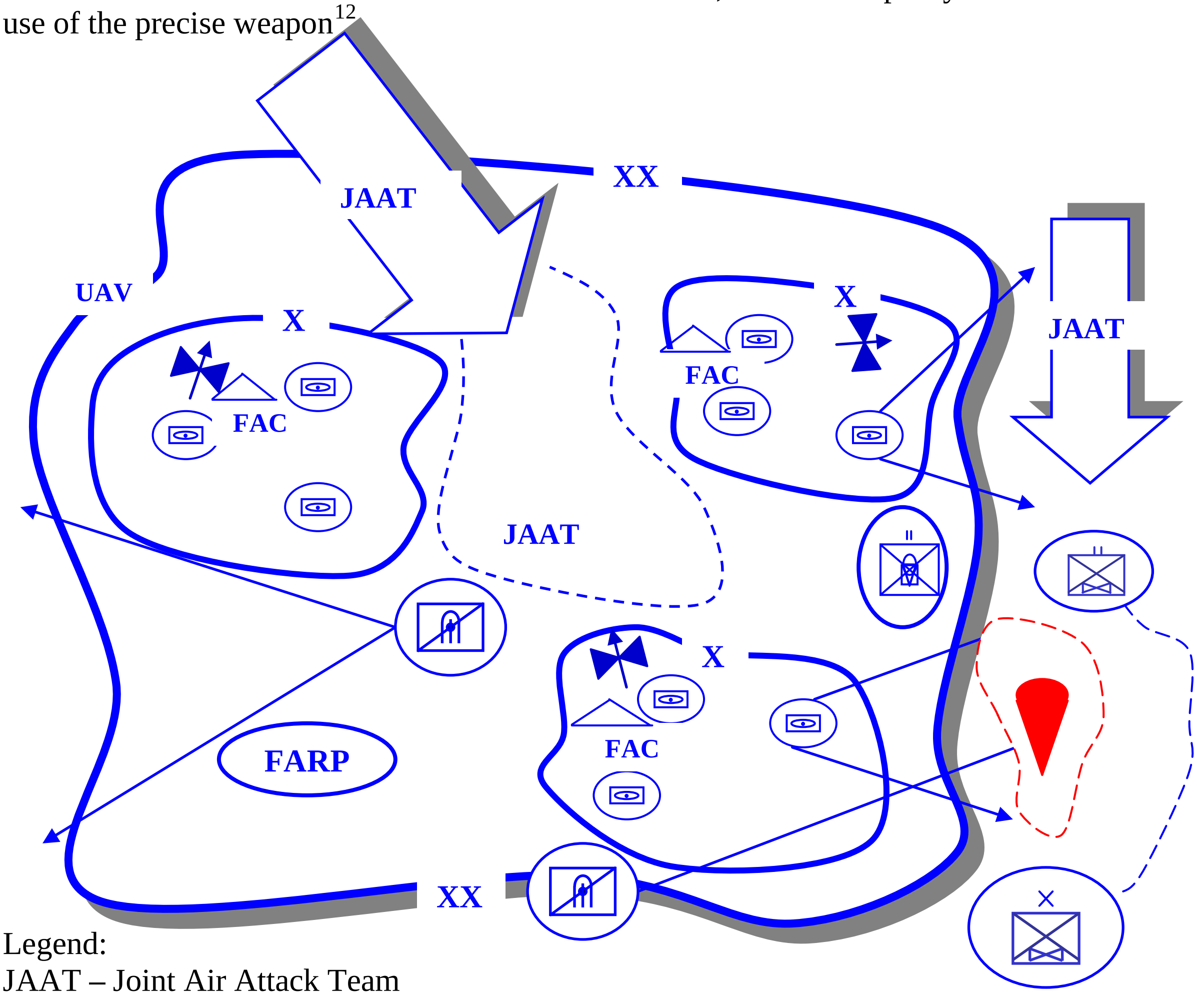
[8] Z. Ścibiorek, W. Kaczmarek, *Przyszła wojna – jaka?*, Warszawa 1995, s. 34-35.

[9] The US Armed Forces conduct defensive and offensive counterspace operations.

[10] *FM – 3.0. Operations*, HQ, Department of the Army, Washington 2001, s. 4–20.

[11] In the "GRANICA 2006" exercise fire support means (army aviation, Brigade Artillery organic battalions) were subordinated to mechanized divisions and brigades. At the land forces commander's disposition only quick reaction forces (QRF) were left. Consequently the divisions were capable of deep deployment and taking advantage from use of close air support (CAS) and air assault forces. Furthermore the mechanized brigades were able to quick fire reaction on threaten direction and use of CAS.

In all probability future operations will encompass a larger area while reducing the number of troops. The operational tempo will be enlarged as well. For example the operation Desert Storm 1991, in which the number of troops operating in 1 km^2 of the operation area was 15 times smaller than during the second world war (chart 1). Next during the operation Iraqi Freedom the operational scale and tempo were 7 times larger than during the Desert Storm. The operation dynamism and efficiency were achieved thanks to a wide application of a new doctrine, called the Rumsfeld doctrine, which is based on an extensive use of informatics nets, the force rapidity and common use of the precise weapon[12]



Legend:
JAAT – Joint Air Attack Team
FARP – Forward Arming and Refueling Point)
FAC – Forward Air Controller)

Figure 1 The divisional task force combat order during the GRANICA 06 exercise
Source: Author

[12] F. Gągor, „*Blitzkrieg" Rumsfelda*, „Polska Zbrojna" nr 18 (328) 29.04.2003.

Specification	War (conflict)			
	I world war 1914	**II world war 1945**	**The Yom Kippur war 1973**	**The Gulf war 1991**
Area occupied by 100 000 troops (km²)	248	2750	4000	213 000
Area width (km)	14	48	57	400
Area depth (km)	17	57	70	533
Number of troops (km²)	404	36	25	2,34
Number m² on one troop	2475	27 500	40 000	426 400

Table 1 The operational area size evolution
Source: G.R. Sullivan, J.M. Dybik, *Działania bojowe na lądzie w XXI wieku*, AON, Warszawa 1993, p. 18.

Conclusions from the operation Iraqi Freedom demonstrate that the operation effectiveness is determined by its tempo. Simultaneous air and ground strikes on the whole enemy's depth, particularly at his key objects, significantly enhance the operational tempo. Thus they restrict own troops casualties as well as the ones between the civilians. Furthermore they make enemy unable to provide an effective operation. According to military theorists the operational tempo is more important than the number of engaged units. The combat force has stopped to be a quantity measured by the mass of committed troops, as the era of multimillions armies had finished a long time ago.

The amount of engaged forces must be optimal, adjusted to the operational conditions. The contemporary domination is not achieved by the concentration of mass forces on chosen directions. There are more important issues than making material supremacy, presented by the number of troops, tanks or guns and they are: the access to actual and credible information, relevant maneuver and efficient command and control, intelligence and weapon systems. The fire support concentration on deciding point and time is particularly essential. Therefore the role of support means increases, of modern field artillery systems among others. The use of the latest technical achievement, high level of training and organizational structures continuous modification, fitted to future operation demands are also imperative. Therefore in the US forces and other leading armies the military potential enhancing will be achieved by the transformation of the present tactical units into modular units, consisting of command and support units (unit of employment - UE) and subordinated combat units (Unit of action – UA), the size of which is equal to the brigade combat team (BCT)[13]. Consequently, future operations will be realized by self efficient combat teams (task forces), able to provide mobile defensive and offensive operations. Their structure will be adjusted dependently on the situation and task. The forces will be getting smaller but they will be active, mobile, flexible, adapting to changing conditions and mainly freed from centralized command and control. Every forces element will be linked with fast and safe network ensuring efficient command and control and a high level of knowledge about the battlefield.

[13] B.T. Boyle, W.M. Raymond, *NLOS Battalion. Fires and Effects in the UA of 2015*, (w:) „Field Artillery", May-June 2003, p. 36.

Thanks to the newest intelligence and weapon systems the task forces will be able to execute simultaneously ground and air long range strikes in the whole operation area. These will facilitate a rapid relocation of the operation centre of gravity. The strikes simultaneousness is strictly connected to the nonlinearity. Until recently the commander's main task was to coordinate main forces operations with deep activities, as in future operations, conducted on the nonlinear battlefield, simultaneous strikes on the objects in the whole area will be required. Well-informed forces, able to move fast and concentrate their effort on determined direction, will be strongly predisposed to execute such tasks[14].

As a result of generating numerous, often independent, fights in the whole operation area, the battle conducted by task forces will have a focal and three dimensional character. The new conception of the task forces operation, called "battle swarm", has been created recently[15]. It is based on systematic, pulsar and synchronized strikes (also lethal), realized from all directions on selected objects by dispersed but networked units. The purpose of these actions is not the physical elimination of the enemy, but the destruction of his entity and cohesion. One of the future operations' discriminates is their maneuvering character. The maneuver will be carried out to occupy the most advantageous positions in relation to adversaries. A rapid movement, executed by forces in the optimal moment, may leave the enemy troops surprised, facilitating their elimination or inactivity.

As a matter of fact operations will be still centrally planned, which will ensure the common object achievement, but the way of their conduction will be significantly decentralized. The effort concentration on determined point and time will likely replace the forces concentration. Therefore it will be possible to abandon the presently applied doctrinal rules, stated in the normative documents and creatively use the art of war principles and materialize in practice the objective command rule. In consequence it will enhance the operation dynamics and permit achieving objects in shorter time while decreasing own and the adversaries' losses[16].

In future operations, considering their dynamics, the time will be one of success conditions. Conclusions from last wars and conflicts point out that it has been constantly reduced. While during the Second World War the decision making process lasted even several days, in the future it will be in the real time (Chart 2). Time determinant permanent increasing obliges the commander to enhance the command process quality, particularly there is significant reduction of the decision making process. Furthermore, the maximal reduction of operations time is fundamental. It will cause the losses reduction and economic costs decrease. Briefness will be one of future operations modernity determinants.

[14] M. Wiatr, *Między strategią a taktyką*, Wydawnictwo Adam Marszałek, Toruń 1999, p. 157.
[15] J. Arquilla i D. Ronfeld, *Swarming and The Future of Conflict*, RAND 2000. 20.03.2008 http://www.rand.org/publications/DB/DB311/DB311.pdf.
[16] M. Wiatr, *Między strategią* ..., wyd. cyt., s. 158.

Specification	War (conflict)				
	I world war 1914	**II world war 1945**	**Operation Desert Storm 1991**	**Operation Iraqi freedom 2003**	**Future wars**
Data processing	Days	Hours	Minutes	Real time	Real time
Weapon (delivery) system choose	Weeks	Days	Hours	Up to two hours (mainly air force)	In reconnaissance real time
Planning process	Months	Up to one week	One day	Hours	One hour or less

Table 2 The time determinant evolution in military conflicts
Source: A. Czupryński, *Charakter przyszłych operacji militarnych*, „Zeszyty Naukowe AON" nr 2/2005, p. 83.

One of modern operations attributes is striving to minimize own as well as the opponent losses. Modern fire systems are able to cause huge infrastructure damages as well as casualties between both combatants and non-combatants. Such operations would not be accepted presently on international arenas. According to the last conflicts analyses the maximal decrease of losses is essential[17]. Present operations prove that one of victory conditions is not the physical destruction of the enemy's forces and weapons but the will of the fight deprivation[18]. It is based on the enemy's combat ability decrease as well as making him aware that his further resistance is pointless or causing him losing his nations' support.
The use of more precision delivery systems results in the casualties minimization. It causes targets selective engagements without accidental casualties in the fire area. Hence in the present military conflicts there are used precision weapon systems both in aviation and artillery more often. While in the operation Desert Storm (1991) precision bombs and projectiles made 7 percent of applied ammunition, in former Yugoslavia (1999) the percentage rose to 30 percent, and in the operation Iraqi Freedom the precision systems made 85-90 percent applied ammunition[19].
One of the main elements which determine the success of every operation is information. It may be assumed that the information struggle will start every battle. It is one of the determinants of the domination over the enemy. The information struggle may be an autonomous phenomenon or a component supporting operations on all levels. We can observe vast changes in information gathering, processing and managing. Not only the quantity of the information is essentially important, but also quality plays an important role. Excellent reconnaissance and intelligence systems provide a lot

[17] The targeting process minimized casualties during operations in former Yugoslavia, Afghanistan and Iraq 2003.
[18] P. Faber, *Rewolucja w dziedzinie wojskowości (Proponowany zarys programu szkolenia)*, „Zeszyty Naukowe AON" nr 4/2003, p. 99.
[19] *Field Artillery on the Crossroads of Transformation*, (w:) „Military Review", January-February 2004, p. 34.

of information, as a result of which the problem is not the lack of data, but its overabundance, so as a consequence the information assessment and use are more complicated.

Getting the information domination is still the main object of combat activities; however, the fighting way and scope of the domination are being changed. The information struggle is like an exceptional race. The time of data collecting, processing and managing must be shorter than the opponent's reaction time[20]. The struggle for the information domination must be permanent and intensive. Since the prompt and credible information regarding the enemy, own forces and operational environment speeds up the decision process, the decision value increases as well, which as a result will allow to achieve superiority over the adversary. Furthermore, it gives a possibility to carry out an optimal maneuver and effective fire engagement. The data transfer enhancement will enable all levels commanders to launch their reports, decisions and tasks faster and more accurately than presently. The constant augmentation of the data transfer tempo is assured by the informatics technology development, as the result of which the information process tempo was enhanced ten thousand times compared with the Second World War (Tab 3)

Specification	**War (conflict)**				
	I world war 1914	**II world war 1945**	**Operation Desert Storm 1991**	**Kosovo conflict 1999 r.**	**Operation Iraqi freedom 2003**
Mean of communication	telephone telegraph	telewriter	computer	internet	teleinformatic network
					
Data transmit speed	32 bit/s	71 bit/s.	256 bit/s	1,54 megabit/s	783 megabit/s

Table 3 The data process and transmit increase in contemporary operations
Source: *Sieci teleinformatyczne w działaniach sieciocentrycznych*, conference materials, AON, Warszawa 2007.

From the above study there results that the information sphere takes the essential place between the possible combat environments and the information struggle will be a firm element of future operations[21].

[20] J. Gruszczyński, M. Fiszer, *Joint Vision 2020. Myśl przewodnia amerykańskiej doktryny obronnej*, „Przegląd Wojsk Lotniczych i Obrony Powietrznej" nr 5/2003, p. 21.

[21] B. Balcerowicz, *Pokój i nie-pokój na progu XXI wieku*, wyd. Bellona, Warszawa 2002, p. 172.

3 NETWORK CENTRIC OPERATIONS

The technology development and especially the electronics achievements cause a more frequent use of modern weapon systems with high automation level, served by few soldiers in upcoming operations. The wide use of unmanned land, air and naval vehicles, often armed, able to operate in all environments and meteorological conditions, may also be assumed. The connection of information with the use of modern weapon systems will guarantee the operation precision and the given objects efficient achievement. According to the last Gulf War experience military operations may have a network centric warfare (NCF) character. The net-centrism is seen mostly in the information area, which mainly is to bond all the participants' potency and effects achieving the operational goals. There has also been shaped the net-centric war conception, which is based on an assumption that the combat force enhancement is generated by the junction in the network of sensors, commanders and weapon systems in order to achieve a common operational picture, augmentation of commanding and operational tempo, weapon effectiveness and resistance on the opponent's strikes enhancing, as well as raising the level of operation synchronization[22].

In net-centric operations, the information superiority is essential, which was confirmed by the operation Iraqi Freedom lessons. During this operation the intelligence was conducted with the use of many different means, such as: satellites, U-2 aircrafts or unmanned aerial vehicles (UAV), for example Global Hawk. In order to achieve the all participants combat theatre understanding, the establishment of the common operational picture (COP) was essential. Every main element of the combat order was linked by fast and safe communication networks assuring dexterous command and high level of knowledge about the battle space. The lessons point out that the information supremacy enhances the forces strength, assures their optimal use and brings advantages from the common operation effects. In consequence of precision strikes, faster achieving of operational goals while minimizing losses and devastations is possible. Hence the net centrism idea will be probably still taking an important place between contemporary theoretical conceptions of military operations.

CONCLUSION

The presented study indicates that future military operations will be characterized by the massive use of most recent technologies, including also modern informatics and precision weapon systems. As the consequence the operations will be more complicated. They will be characterized by: activities integration, multidimensional and multi environmental space, enhanced tempo and theatre, precision, nonlinearity, synchronism and focalization, informatics domination and net-centrism. Most likely the adversary deprivation of the fight motivation will be more important than his physical elimination. Operations will be conducted by highly mobile modular task forces, integrated by tele-informatics networks, what will guarantee an efficient command process and clear operational picture. The command and control automation is one of essential elements of the successful present and future operation conditions, particularly those which are to be conducted in the network centric environment.

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[22] R. Szpakowicz, *Wojna w Iraku a koncepcja wojny sieciocentrycznej*, „Przegląd Wojsk Lotniczych i Obrony Powietrznej" nr 11/2003, p. 7.

Bibliography references

[1] Balcerowicz, B. *Pokój i nie-pokój na progu XXI wieku*, wyd. Bellona, Warszawa 2002.

[2] Boyle, B., T. and Raymond, W., M. *NLOS Battalion. Fires and Effects in the UA of 2015*, (w:) „Field Artillery", May-June 2003

[3] Czupryński, A. *Kampania i operacja – próba systematyki pojęć,* (w:) *Charakter przyszłych operacji,* materiały z konferencji naukowej, AON, Warszawa 2004.

[4] Faber, P. *Rewolucja w dziedzinie wojskowości (Proponowany zarys programu szkolenia)*, „Zeszyty Naukowe AON" nr 4/2003.

[5] Gągor, F. *„Blitzkrieg" Rumsfelda*, „Polska Zbrojna" nr 18 (328) 29.04.2003.

[6] Gruszczyński, J. and Fiszer, M. *Joint Vision 2020. Myśl przewodnia amerykańskiej doktryny obronnej*, „Przegląd Wojsk Lotniczych i Obrony Powietrznej" nr 5/2003.

[7] Szpakowicz, R. *Wojna w Iraku a koncepcja wojny sieciocentrycznej*, „Przegląd Wojsk Lotniczychi Obrony Powietrznej" nr 11/2003.

Roman ŠPERKA

MULTI-AGENT SYSTEMS FOR BUSINESS PROCESS MANAGEMENT - OVERVIEW

Abstract:
Business process management systems are used in corporate environment to reduce their routine business and administrative work in order to improve business processes. This paper focuses on the multi-agent solutions for the business process management. The purpose of the paper is to describe the key concepts of the agent-based system design and to point out the main differences between agent-based and traditional business process management approaches.

1 INTRODUCTION

In the systems engineering sector, a process is a sequence of events that uses inputs to produce outputs. According to [3] the process management, based on a view of an organization as a system of interlinked processes, it involves concerted efforts to map, improve, and adhere to organizational processes. The Business Process Reengineering (BPR) movement of the 1990s emphasized technology as a key enabler of the process management and process change. As a result, information technology (IT) has steadily gained a prominence in the management suites of large enterprises. The Business Process Management Systems (BPMS) deployment provides a closer relationship between business process designers, and IT helps to reduce the gap between the business requirement and the final deployed solution.

The key concept of Business Process Management (BPM) is the convergence of technologies with process management theories. This convergence produces a new process design and implementation approaches that enable what Michael Hammer [6] terms the process enterprise. BPM solutions enable the process enterprise to measure and standardize processes and provide reusable processes that can be networked. This new breed of technology eases the task of changing business processes by separating the underlying applications from the business processes. Processes are no longer etched in stone once they are conceived. This inflexibility to support changing business processes was the bane of many business applications. [3], [10]

Previous works [1] and [9] describe BPMS as ideal for managing business processes which are well structured and where all logical paths can be fully predefined. However, not every business process is like this. Furthermore, the business environment is becoming more dynamic and volatile, and follows more complex processes. The existing BPMS have a number of drawbacks and limitations [9] and [14]. They need an improvement and changes. Therefore new approaches, which also include agent-based technologies, are rapidly emerging. The main advantages of the agent-based approach over more traditional counterparts such as management information systems, workflow management, and enterprise integration are those that it offers greater flexibility, agility, and adaptability. [5] Many research teams have introduced their own solution of the BPM systems using agent technology [2], [7], [9] and [12]. There are various approaches; each has its own particular enhancements and features of using the autonomous, collaborative and intelligent software agents with an agent-based system.

The purpose of the paper is to describe the key concepts of the agent-based system design and to point out the main differences between agent-based and centralized BPM approaches. This paper is structured as follows. Section 2 briefly informs about the BPM principles. In section 3 the intelligent agent description is presented. In section 4 and 5 we summarize the advantages and disadvantages of traditional and agent-based BPMS.

2 BUSINESS PROCESS MANAGEMENT

BPM is a systemic, structured approach to analyse, improve, control, and manage processes with the aim of improving the quality of products and services. From this definition, BPM has evolved into a management approach. Chang [3] summarizes these BPM principles:

- **Processes Are Assets** - functions or individuals do not produce value for customers. They might be responsible for a part of the overall work, but customers will not perceive value from standalone functions;
- **Processes Should Be Managed and Continuously Improved –** the management of processes entails the tasks of measuring, monitoring, controlling, and analysing business processes. These three tasks go hand in hand;
- **Information Technology Is an Essential Enabler** - in the new industrial engineering, business processes are the focus for an improvement, and IT is the key enabling tool. IT can provide real-time process information that is very important or BPM to accomplish its tasks of monitoring and controlling business processes.

BPM is characterized by these practices:

- **Process-Oriented Organizational Structure** – an organizational setup reduces the duplication of functions but still allows the organization to benefit from the process-focus one;
- **Appoint Process Owners** - a process owner is responsible for the performance of the process assigned. The process owner designs, deploys, and improves the process;
- **Top-Down Commitment, Bottom-Up Execution** - practitioners have found that the best way to implement BPM is to align it with the strategic goals of the organization;
- **Use IT to Manage Processes** - traditional systems implementation methodology is focused on functions and objects. Processes are relegated to a workflow which usually does not receive a major attention during the implementation;
- **Collaborate with Business Partners** - the management of business processes should not stop at the edge of the organization. Increasingly companies are getting more and more focused on what they want to perform in a house;
- **Continuous Learning and Process Improvement** - in the customer-centric economy, the competition is fierce and organizations have no choice but to continuously improve their current offerings and introduce innovative new offerings;
- **Align Employee Rewards to Process Performance** - employee rewards should be aligned to the performance of the business processes. This creates the situation

where workers only want to maximize their functional performance at the cost of collaboration with other functions;
- **Utilize BPR, Total Quality Management (TQM), and Other Process Improvement Tools** - BPM organizations can choose the proper tool for the appropriate situation. For incremental improvements, Six Sigma Define, Measure, Analysis, Improve, and Control (DMAIC) could be deployed.

By introducing the core principles and practices of BPMS, we are faced with the second important notion of the business process management - a Workflow Management Systems (WfMS). Workflow is defined as the automation of a business process, in whole or part, during which documents, information or tasks are passed from one participant to another for an action, according to a set of procedural rules defined as workflow. So the workflow can be any business process, which consists of two or more tasks performed in a serial or concurrently by two or more people. The workflow should assure that the right people receive the right information at the right time. The workflow provides the following general information about the business process [5]:
- Individuals and teams needed to complete a task;
- Information and resources needed to complete a task;
- Dependencies and deadlines for the task completion.

3 INTELLIGENT AGENTS

A lot of research has emerged into the application of agents and agent-oriented concepts to help solve specific challenges faced by current industry WfMS solutions. The motivations for agents' adoption in the workflow as discussed in [4] and [16] are as follows:
- Workflow domains typically involve disparate data requiring distributed components encapsulating local problem solving capabilities. Standard distributed WfMS applications tackle the inter-process communication aspects but fall short of dealing with the autonomous problem solving nature of the components involved.
- Workflow domains typically involve several discrete parts of an organisation structure working autonomously albeit interacting as and when required to achieve a common goal, an approach congruent with the agent paradigm.
- Agents can facilitate an intelligent management of resources and workload through the coordination and negotiation.
- Agents can provide the ability to deal with unpredictability through intelligent goal-driven autonomous decision-making, altering execution paths in order to achieve goals, including the possibility of learning capabilities.
- Agents can help ease interoperability and hence integration between components of a WfMS and even separate discrete WfMS instances given the naturally distributed systems architecture of multi-agent systems and the flexibility of semantic messaging as a more generic application interface than typical API-based approaches.

Yan, Maamar and Shen [16] also describe how some current WfMS solutions claim to leverage the power of agents in what the authors distinguish as "agent-enhanced workflow management". In these approaches agents are used as a peripheral technology to the core workflow engine for tasks such as: personal assistant to human users, organising, filtering etc.; making some context-based autonomous decisions without interrupting the human user; the generic interoperable interface for the integration with other applications.

An agent is defined as a flexible software entity capable of performing an autonomous action within the environment in which it is situated. In order for an agent to act appropriately, it must determine the situation in which it finds itself. The full set of actions available to an agent is described by Wooldridge [15] as its effectoric capability. Choosing the appropriate action for this set is done at runtime based on the decision making system employed by the agent. An important and prevalent aspect of agent technology is the notion that typically no agent has full control of its environment. Rather it maintains a certain (often limited) view of the environment over which it can hold some influence. The natural consequence of this partial view is that an agent often cannot guarantee an outcome for a situation within which it plays a part as a result of performing its action. Agents must therefore be prepared for non-deterministic behaviour within the environment and to adapt itself according to the circumstances.

Most practical uses of agent technology involve not just a single agent, but multiple agents working together in some collaborative way to fulfil a higher-level objective. This constitutes a multi-agent system (MAS) and by nature represents a decentralised distributed application environment where each agent maintains some level of the control or influence in the environment [13], [15]. In MAS, each agent is aware that it does not possess a global view of the problem and that it cannot solve the problem by itself, thus relying on the interaction and coordination with others. It is however still programmed to operate autonomously to compete for satisfaction of its own self-interests, which it believes are benevolent to the goals of the overall group. Fundamental to a MAS environment is this ability for agents to demonstrate social interaction with other agents. As in human social contexts, how agents go about an interaction, depends on their role and the relationship they have with the target agent. These relationship categories as described by [11], [15] can include: peers or fellow team members where familiarity and trust are already established; authority relationships where one agent has more power or influence over another; coalitions of agents within or across organisational boundaries with stricter rules of the engagement in place to allow agent participation within a wider problem solving initiative.

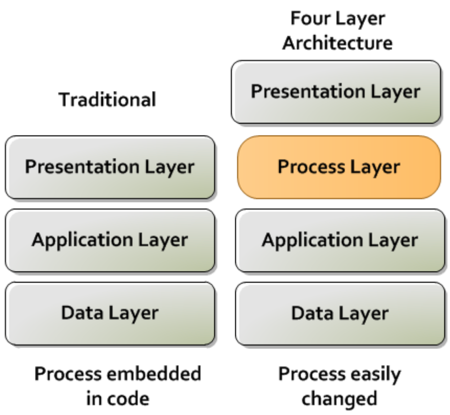

Figure 1 – BPM Architecture (source: adapted from [2])

The development of agent architectures represents one particular strand of the research operating under the Agent-Oriented Software Engineering (AOSE) discipline. It considers the practical implications of implementing agent systems, focussing on providing development toolkits and runtime environments that support the agent paradigm. Encompassed within agent architectures, there are considerations relating to agent lifecycle management; service provision; communication protocols and mechanisms among others, all of which are encapsulated away from the agent developer to facilitate an appropriate separation of concerns within the grander system architecture. Here we look at five broad categories of agent architectures: Deliberate, Reactive, Social, Mobile and Hybrid. [8]

4 TRADITIONAL INFORMATION SYSTEMS FOR BPM

An information system for BPM is a system that defines, creates and manages the execution of workflows through the use of software, running on one or more workflow engines, which are able to interpret the process definition, interact with workflow participants and, where required, invoke the use of IT tools and applications. Such systems typically consist of the following components [14] (Figure 2): business process definition tools, business process servers, business process client applications and business process monitoring and administration tools. Business process definition tools allow you to define and map out the business process in the computer. The formalized build time business process, represented as a coordinated (parallel and/or serial) set of tasks that are connected for a common goal. Business process servers are the programs providing the run time execution of defined processes. They read the process definition and actually execute and track them. A business process client application is the software that the business participant uses to interact with the workflow. The software does not need to be the part of the BPM system. [5]

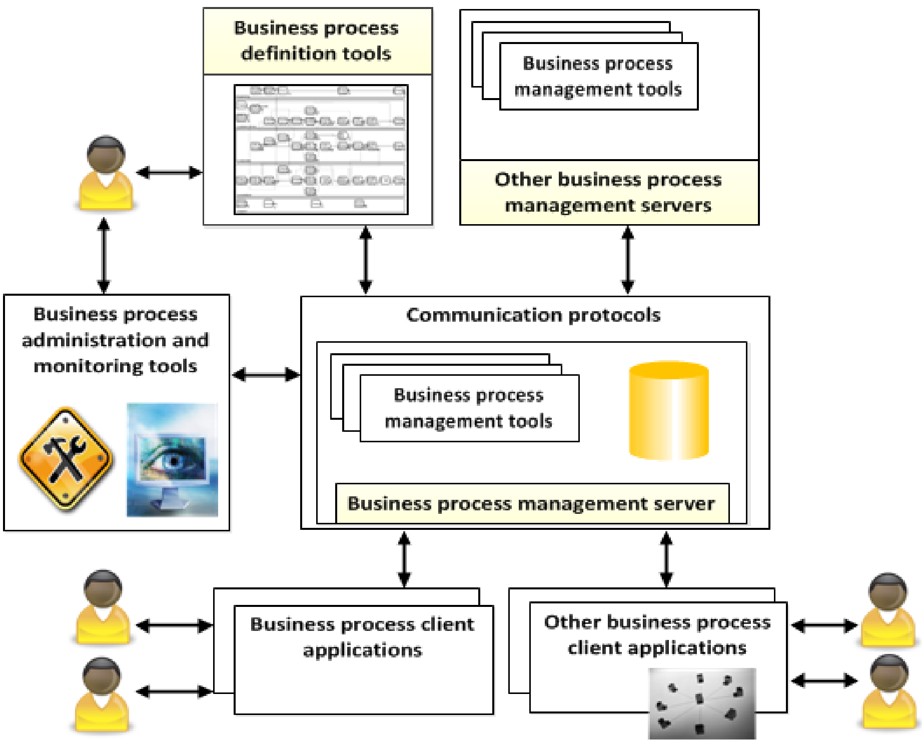

Figure 2 – Conceptual model of centralized business process management system (source: adapted from [14])

The majority of current generation BPM systems pay a primary attention to business process tasks interdependences, namely, to the enactment sequence of the tasks. Existing systems provide a central workflow engine for a business process analysis and management, which monitors all events in the system. Such systems can be adequate only in situations where a business process is fully resourced and every conceivable outcome can be considered and controlled. Unfortunately not all business processes can be defined unambiguously. The real world business is a complex, continuously changing environment, so it is hard for centralized BPM systems to reflect real world changes adequately. Their structures suffer from a number of drawbacks and limitations, including [9] and [14]:

- Limited flexibility during process enactment;
- Inability to cope with dynamic changes in resource levels and a task availability. Existing systems tend to lack the necessary facilities to redistribute work items automatically as and when required;
- Inadequate exception handling, especially during the processing of decomposed items;
- Limited ability to predict changes, due to external events, in both the volume and the composition of work;
- Incompatibility of the systems components. The majority of existing BPMS consists of comparatively independent subsystems, which can hardly be linked to each other;
- Poor system accessibility and usability by the users;
- Inadequate representation of the real world business process that makes it difficult for users to work with this system (especially for BP participants that are not involved in the system maintenance), which in their turn leads to the situation, when the system is not used by the users, and it just represents a wider gap between the real world process and it's computer representation;
- Usually the lack of performance, scalability and reliability.

5 AGENT-BASED BUSINESS PROCESS MANAGEMENT SYSTEMS

One of the possible decisions to eliminate the drawbacks of the traditional BPM systems is to involve agent technology in the coordination of business processes. An agent-based BPM system is a set of software components that meet the criteria to be considered as agents and are involved in managing the flow of work through a business process [14]. The idea of the agent-based BPM systems is to split a business process into groups in order to commit the coordination of this process groups to an autonomous software agent (Figure 3).

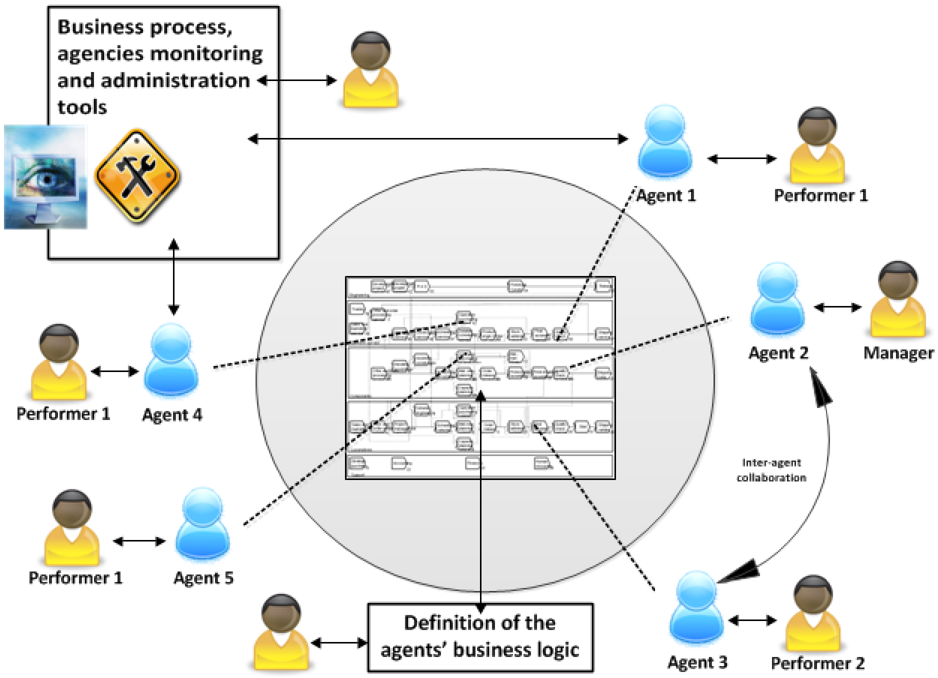

Figure 3 – Conceptual model of agent-based business process management system (source: adapted from [14])

Business logic, explicitly defined to an agent by a set of business roles, is intended to show agent's task and resource dependencies on other business process participants, which usually are agents too. Agents use business logic to plan their activities in order to achieve the goal of the concrete process participant. Communication protocols are implemented in order to allow an agent to synchronize their actions. The knowledge about the business process logic is distributed among participants of the process. Each agent acts according to his user goal, provides actual information about participant's current tasks and deadlines. Intelligent agents should be able to plan their actions, make searches for achievements of alternative goal solution parts, explain own actions to the user and give advice.

5.1 ADVANTAGES OF THE AGENT-BASED BPMS

Here the authors sum up the main advantages of an agent-based BPM usage [1], [11]:

- The use of goal oriented, communicating autonomous agents, which also concerns about business logic, allows multiple solution paths to the business process goal to be achieved;
- Agent-based technologies allow greater flexibility and dynamism in the business process management system. Decoupling components of the system allows them to be swapped out, replaced, or even added to the system without impacting on other parts;
- It allows decentralized ownership of the tasks, information, and resources involved in the business process;
- Agent-based systems provide an access to the system, even if the system is physically distributed. They allow building highly decentralized, distributed systems, which corresponds to the real world situation, when the business processes in organizations are physically distributed;
- The use of autonomous agents provides a high degree of natural concurrency, when many interrelated tasks are running at any given point of the business process.

5.2 DISADVANTAGES OF THE AGENT-BASED BPMS

As mentioned in [9] the very nature of the agent paradigm leads to a number of problems, common to all agent-based applications:

- Agent-based systems have no overall system controller. It means that agent-based solution is not the best choice for managing business processes with a lot of global constraints to be maintained. The agent-based solution is not appropriate for domains in which global constraints have to be maintained, in domains where a real-time response must be guaranteed, or in domains in which deadlocks must be avoided;
- Agent-based systems have no global perspective. An agent's actions are, by the definition, determined by that agent's local state. However, since in almost any realistic agent system, the complete global knowledge is not a possibility, this may mean that agents make globally suboptimal decisions. This is one of the main issues that the agent-based business process systems managers should take care of;
- Users of the agent-based system usually face trust and delegation problems. For individuals to be comfortable with the idea of delegating tasks to agents, they must first trust them. Users have to gain confidence in the agents that work on their behalf, and this process can take time.

CONCLUSION

This paper looks through general theoretical questions about agent-based business process management. It gives an overview of the main concepts of BPM and figures a general conceptual model of the traditional and agent-based BPMS. The paper points out key properties of agent-based BPMS, sums up main advantages and disadvantages of such systems. The existing agent-based BPMS solutions, which have already been developed and applied as the solution of the real world problems, prove that the agent technologies are a highly perspective direction for future researches.

Bibliography references

[1] BOLCER, G. A., TAYLOR, N. R. *Advanced Workflow Management Technologies* [online]. Available from: <http://www.endeavors.com/pdfs/advancedworkflow.pdf>.

[2] CAI, T., GLOOR, P. A., NOG, S. *DartFlow: A Workflow Management System on the Web Using Transportable Agents.* Dartmouth College, 1996.

[3] CHANG, J., F. *Business Process Management Systems. Strategy and implementation.* New York: Auerbach Publications, 2006, ISBN: 978-0-8493-2310-2.

[4] GREGORI, M.E., C´AMARA, J. P., and BADA, G. A. *A Jabber-based Multi-Agent System Platform.* Proceedings of the fifth international joint conference on Autonomous agents and multiagent systems. Dept. de Sistemas, Informaticos y Computacion, 2006, Universidad Politecnica de Valencia.

[5] GRUNDSPENKIS, J., POZDNYAKOV, D. *An Overview of the Agent Based Systems for the Business Process Management* [online]. International Conference on Computer Systems and Technologies - *CompSysTech'06*. Available from: <http://ecet.ecs.ru. acad.bg/cst06/Docs/ cp/SII/II.13.pdf >

[6] HAMMER, M., CHAMPY, J. *Reengineering the Corporation: A Manifesto for Business Revolution (Collins Business Essentials).* Rev Upd edition. New York : Harper Paperbacks, 2003. 272 p. ISBN 978-0060559533.

[7] HAWRYSZKIEWYCZ, I., DEBENHAM, J. *A Workflow System Based on Agents.* Vienna: Database and Expert Systems Applications, 9th International Conference - DEXA'98, 1998.

[8] HEERY, K. *Agent-based Workflow Management using XMPP and CARTAGO* [online]. Dublin: School of Computer Science and Informatics, University College, 2009, 131 p. Thesis. Available from: <http://www.agentfactory.com/~rem/publications/heery_ thesis.pdf >.

[9] JENNINGS, N. R., FARATIN, P., JOHNSON, M. J. et al. *Agent – Based Business Process Management.* London: Dept. Electronic Engineering, Queen Mary & Westfield College.

[10] JENNINGS, N. R., FARATIN, P., NORMAN, T. J., O‟BRIEN, P., WIEGAND, M. E., VOUDOURIS, C., ALTY, J. L., MIAH, T., MAMDANI, E. H. *ADEPT: Managing Business Processes using Intelligent Agents.* Dept. Electronic Engineering, Queen Mary & Westfield College; BT Research Labs; Dept. Computer Studies, Loughborough University; Electronic Engineering, Imperial College, 1996.

[11] JENNINGS, N. R., WOOLDRIDGE, M. *Application of Intelligent Agents* [online]. 1998. Available from: <http://agents.umbc.edu/introduction/jennings98.pdf>.

[12] JIN, W., CHANG, S. T. *Agent-based Workflow* [online]. TRP Support Environment (TSE). Available from: <http://www.geckil.com/~harvest/www5/papers/P53/ Overview.html>.

[13] O'HARE, G. M. P., JENNINGS, N. R. *Foundations of distributed artificial intelligence.* John Wiley & Sons, 1996, ISBN 0-471-49691-X.

[14] PANG, G. *Implementation of an Agent-Based Business Process* [online]. Available from: <http://www.ifi.unizh.ch/ifiadmin/staff/rofrei/DA/DA_Arbeiten_2000/ Pang_Gian.pdf>.

[15] WOOLDRIDGE, M. *MultiAgent Systems: An Introduction to.* 2nd edition, John Wiley & Sons Ltd, Chichester, 2009.

[16] YAN, Y., MAAMAR, Z., SHEN, W. *Integration of Workflow and Agent Technology for Business Process Management.* 2001.

Karel VÁVRA

MEDIUM-TERM BUDGET – STABILITY AND PRIORITIES - SHORT EX POST ANALYSES OF FINANCIAL SOURCES IN DEFENCE

Abstract:
The World Armament Expenditures is still growing, but European military budgets are being reduced again. A significant risk exists that strict savings of expenses in the defence sphere will finally predominate over the aim of the achievement capabilities of facing new security threats. The Czech Republic has to face the same problem. This context shows a development of the Ministry of Defence budget and three points of view on financial sources diversification. The monitoring system passed over a financial aspect and went through from factual to objective view-point. It is also focused on shift from efficiency to effectiveness and economy. Can it help to eliminate negative impacts of expected shortages?

INTRODUCTION

In the beginning of this paper, it is important to describe the current trend in advanced industrial countries in relation to the size of public financial sources for allocation into defence. World armament expenditures are still growing,[1] but up-to-date trend, especially in countries of European Union, expresses a general tension to reduce military budgets. It is necessary to understand this situation with regards to public deficit growth in Eurozone.[2]

There are obviously two different voices which react to the arisen situation. On one hand, some expert articles were published about strengthening pressure for a better economical behaviour of the Armed Forces by the expenditure reduction. On the other hand, serious impacts were also described of an excessive cut-down in NATO. It pays for both long-term and short-term NATO members. Reaction to the Report about the Strategic revision of the British defence and security described serious impacts of cuts in the military budgets. This critical reaction showed the danger that the strict savings of expenses in the defence sphere finally predominated over the aim of the achievement the capabilities of facing new security threats.[3] The NATO Secretary General was concerned with it and proposed particular recommendations in his paper for overcoming strictly set cuts of the budgets (spreading the burden of security, organizational reforms, common funding, role specialization or avoiding duplication) to resolve upcoming problems for adequate security provision.[4]

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1 ŠTANCL, L.: *The armament industry in conditions of globalization*, In Economics and Management, number 2/2009, Brno: University of Defence, ISSN 1802-3975, pages 8 to 9.

2 MANDYSOVÁ, I.: *European monetary stability versus regional governments*, In Economics and Management, 2010, number 2, Brno: University of Defence, ISSN 1802-3975, pages 7 to 15.

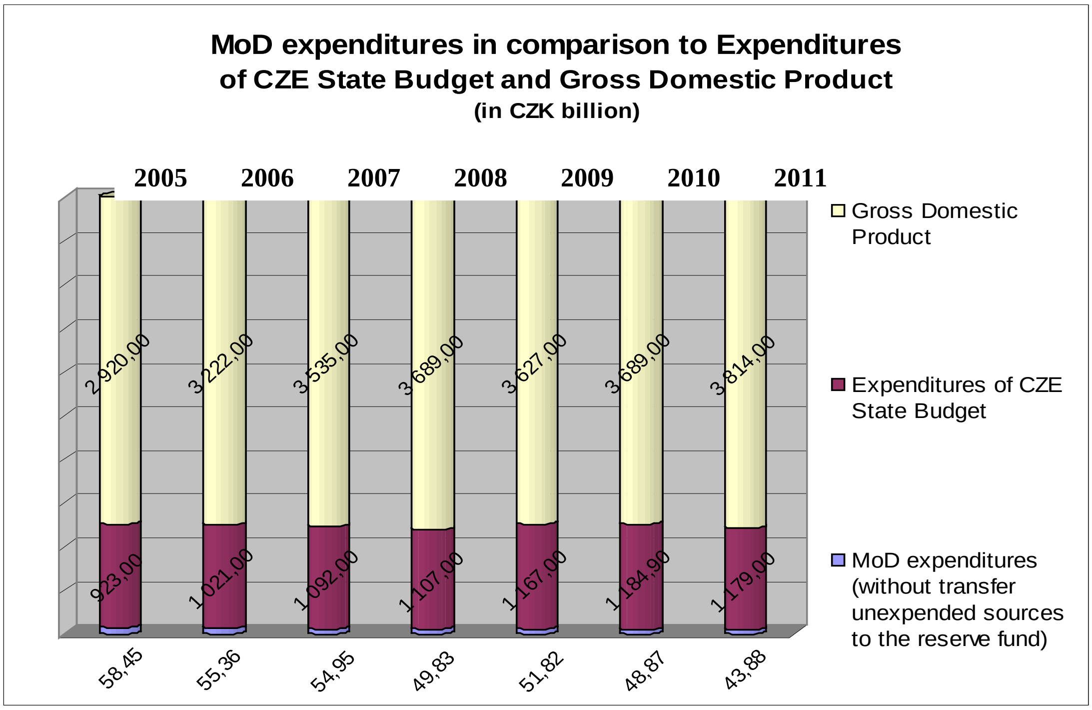
3 You can read more in *Jane's defense weekly*, 2010, volume 47, number 43, page 18.

4 RASMUSSEN, A. F.: *Security Policy in an Era of Budgetary Scarcity,* In European security and defense, 2010, number 3, pages 7 to 9.

With respect to this, Armed Forces primarily call for budgetary stability in the nearest future years to guarantee sustained level of military capabilities and their righteous development. With regards to expected cutting of public expenditures in the Czech Republic, this problem is very topical for the Czech MoD budget too. It is obvious the effective behaviour improvement is emphasised. Therefore, there exists a need to analyze trends and conditions of the economic management as a way for better economic decision making.

1 CZECH MILITARY BUDGET DEVELOPMENT

As the following graph will show, the Ministry of Defence (MoD) expenditures decreased in last seven years significantly. It is also obvious that the gap between MoD expenditures and Gross Domestic Product or Czech State Budget Expenditures have widened.



Graph 1: MoD expenditures in comparison to Expenditures of CZE State budget and Gross Domestic Product
Source: Created by author. Data was taken from: MoD Budget (1993 – 2011). Attainable on: www.army.cz.

We can see that the difference between the MoD budget in 2005 and in 2010 is more than 14 billion CZK. It is almost 25 % of MoD budget amount in 2005. As *White paper on defence* (WPD)[1] confirms, the military budget is going down systematically, but without any systemic comprehensive analyses. On one hand, based just on WPD, there are positive signals that the next defence development will be stabilized. The Minister of Defence tried to construct WPD as well-balanced document with a wider acceptation on the side of security specialists and on the side of civilian public, including political representatives. This material was finally approved by the National Security Board and by the Czech government.

[1] WPD was approved on 18th may 2011 by the Czech government, electronically achieved on www.army.cz.

On the other hand, we can expect continual cuts in public expenditures (as Minister of Finance signalized repeatedly because of the process of consolidation of public finances). Therefore, the process of WPD implementation cannot calculate with the same amount of financial sources which the MoD has now.

These facts signalize an inconsistent approach to the next Czech Armed Forces (CZAF) development – the high quality of the CZAF is expected though no funding is available. There is a public meaning, particularly represented by the working council and by other participants on WPD, which supports to have a smaller yet functional and operational army, which will be able to fulfil its main missions. Another opinion of public meaning cares less about the operational level of CZAF capabilities and more about the state budget savings.

Despite the fact of fiscal consolidation with regards to updating of the Czech Republic convergent programme (according to EU recommendations), there is no way to prefer a financial sight to a factual need for fulfilment of given security tasks and requested capabilities. In a short-term point of view, it can bring some savings of public sources. In a mid or long-term perspective, it will probably bring a loss of many capabilities because of outgoing staff, obsolete weaponry systems and the low level of training support. It can bring the inability to uphold the Czech Republic security obligations arising from membership in NATO. We can expect decadent providing of the adequate internal and external defence.

2 EVALUATION OF THE CZECH MILITARY BUDGET DEVELOPMENT

Previous deprecating paragraphs ought to be balanced by the promised analyses of MoD budgets in the last few years. The first point of view is financial and characterizes three essential types of military expenditures groups. You can find more than a financial point of view here. The second perspective brings source development according to expenditure activities structure (The Activity List). It is similar to the set of DOTMLPFI method indicators.[6] The third one compares the money and strategic goals in the approved and adjusted MoD budget (during a fiscal year) in 2010.

2.1 THREE EXPENDITURE CATEGORIES – POLICY AND REALITY

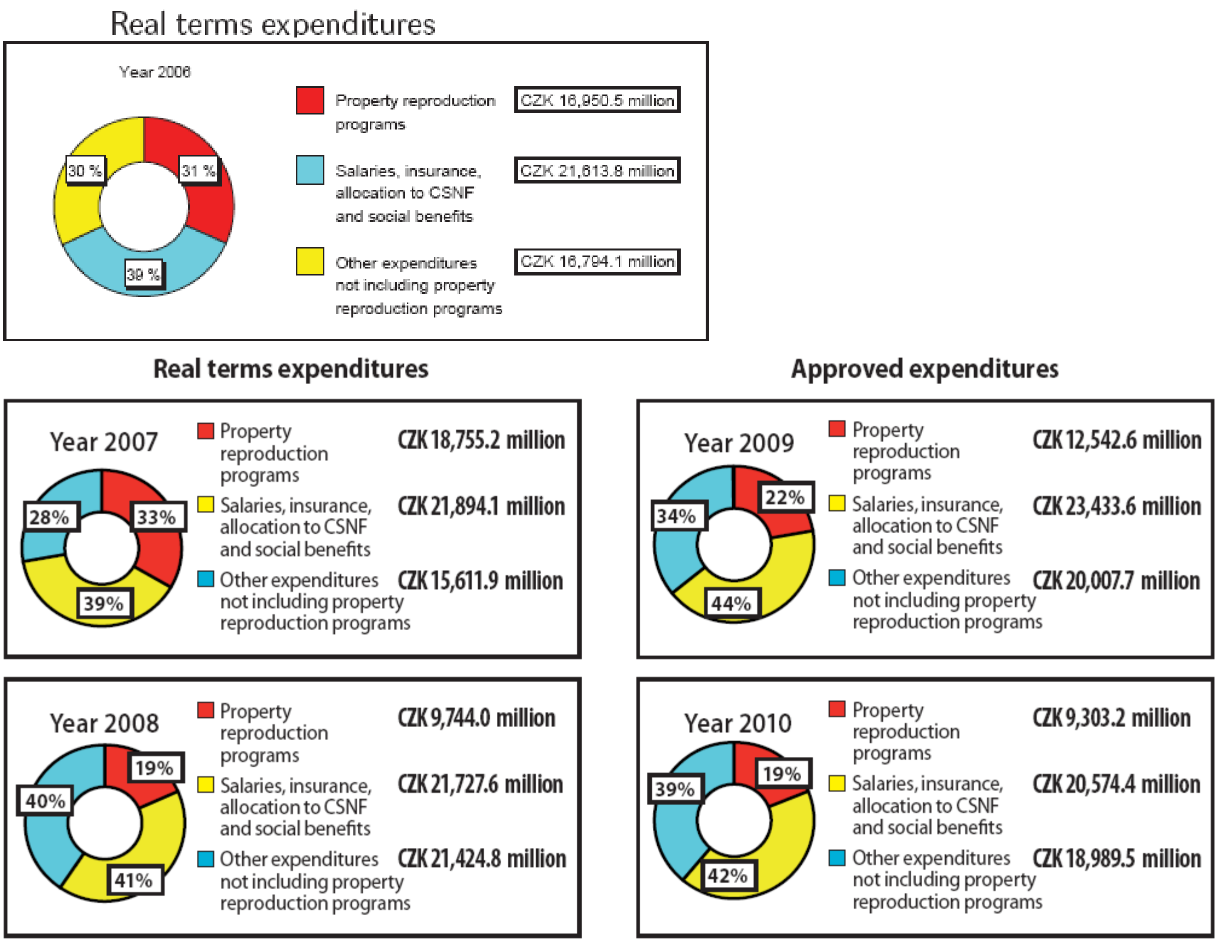
The three expenditure categories of MoD budget are:
- Property reproduction programs expenditures (investments);
- Salaries, insurance, allocation to CSNF and social benefits (personal expenditures);
- Other expenditures not including property reproduction.

Development of mentioned categories is shown both in an actual amount of spent financial sources and in a percentage share on the whole budget in every fiscal year. To prevent possible confusion, let me please emphasize that for real terms expenditures in 2006 a different color signature was used in the next picture (colours used for personal expenditures and other expenditures were exchanged). Let me also add a following short commentary:
- **Personal (mandatory) expenditures** (PME) were increasing from 2006 to 2009 in real numbers (the decrease in 2010 started as an impact of a massive reduction of the military and civilian staff of the CZAF). In percentage rate, PME share on the MoD budget was increasing from 2007 to 2010 surprisingly (percentage rate

was higher in 2006 than in 2007). It shows a trend of the PME escalation in conditions of the budgetary scarcity. This trend kept stability regardless of the massive reduction of the staff at the end of 2009;

- **Property reproduction programs expenditures** (PRPE) were increasing from 2006 to 2007 and in 2009 in real numbers (in comparison to the prior year). This category of military expenditures was decreasing in 2008 and 2010 and the share on the global MoD budget had a very similar real amount (the difference was 0,341 million CZK) and the same percentage rate (19 %). It signalized relative financial stability of PRPE;
- **Other expenditures not including property reproduction programs** (OE) slightly dropped down in 2006 and 2007. In 2008, they rapidly grew by almost 6 billion CZK more (compared with 2007). After this boom, these expenditures came down approximately 1,5 billion CZK in 2009. Another 1 billion CZK was taken away in 2010 (compared with 2009). The percentage share made up more than 40 % of the MoD budget.

The next picture, taken out of the official MoD publication (*Budget – Facts & Trends 2008/2010 and Budget*), expresses this development in last five years.



Graph 2 – Development of proportions among Main Categories of MoD Expenditures
Source: Budget – Facts & Trends 2008 and Budget – Facts & Trends 2010, Prague: MoD, 2008 and 2010,
ISBN 978-80-7278-458-5 (2008) and 978-80-7278-545-2 (2010), page 13 (2008) and 12 (2010).
Attainable on: www.army.cz.

In my opinion, there are two features pointing towards inappropriate usage of the MoD budget with regards to the mentioned categories of expenditures. According to the MoD expenditure policy (as you probably know, separation on 50 – 20 – 30 % in the sequence PME – PRPE - OE), the first one is **unbalanced proportion** between these categories. There still exists a huge amount of OE which is used especially for operational tasks. The main aim of MoD expenditure policy was to keep a sustainable progress of capabilities. For this approach, of course, it is necessary to have a well-trained and capable staff and to use high-quality weaponry. The MoD budget development expressed that expenditures dedicated for human and capital sources (especially for a staff stability and weapon system improvement) were being cut.

The second feature is that only a financial perspective of three main expenditure groups **does not bring enough information** for strategic decision making as MoD actually needs. The strong pressure on the reduction of public expenditures brought requests to implement more transparent and credible methods of evaluation, planning and budgeting. That was why the Planning, Programming and Budgeting System implementation started in the 90´s. However, it was stopped in 2004 and replaced by the system of progress and activity planning (for execution of the Armed Forces reform arrangement).

2.2 ACTIVITY LIST – FACTUAL CONTENT OF FINANCIAL SOURCES

The Activity groups system (MoD expenditures divided according to The Activity list) made it possible to connect factual and financial aspects of the planning and budgeting process. In the late nineties, it was subsequently developed from a previous monitoring system based on the purposes of expenditures. Designated manager for the purpose (later activity) had a control of his partial budget. The system was used for a better determination of factual expenditure content in accounting. It has been used in MoD financial management until 2010 (it was possible to analyze data in five last years). An observation of activities was cancelled at the end of 2010 and MoD lost a continual historical development from this stand-point. Because of obsolescence, this system was replaced by the Management by objectives method (in relation to requests of the newly prepared state exchequer system).

Next table shows expenditure diversification into the Activity groups in last five years.

Activities	Amount (In CZK million)				
	2006	2007	2008	2009	2010
Current life support	26,984.9	24,794.8	24,813.0	26,483.9	24,936.5
Centrally planned MoD-wide activities	10,050.3	10,170.6	9,717.2	11,540.6	6,661.1
Build-up and development of Forces	6,637.1	9,478.3	10,577.3	6,397.4	7,669.6
Troops and reserves training	4,925.1	3,746.1	3,991.5	4,421.5	3,858.8
Activities abroad	2,426.9	2,335.8	2,385.6	3,769.0	3,071.9
Command and Control	1,957.4	1,498.6	1,274.6	1,391.1	1,559.1
Ecology and disposal of redundant property	1,516.4	0,905.1	0,335.2	0,284.1	0,263.3
Transfers, contributions and subsidies	0,647.7	0,604.9	0,740.4	0,741.2	0,534.2
Human resources preparation, use and their development	0,466.6	0,280.5	0,253.3	0,289.2	0,281.7
Public relation	0,081.6	0,091.7	0,078.5	0,065.9	0,030.8

Table 1 - The MoD budgetary expenditures diversification into Activity groups from 2006 to 2010
Sources - Created by author.
Data was taken from Budget – Facts & Trends 2006, 2007, 2008, 2009 and 2010, Prague: MoD, 2006 to 2010, ISBN 80-7278-334-3 (2006), 978-80-7278-398-4 (2007), 978-80-7278-458-5 (2008), 978-80-7278- 504-9 (2009) and 978-80-7278-545-2 (2010), page 28 (2006), 30 (2007), 31 (2008), 31 (2009) and 28 (2010). Attainable on: http://www.army.cz.

We can say that expenditure diversification reflexes quite large differences both in defined groups of activities and in monitored years. A category of the **Current life support** represented any expenditure not given to the other categories and touching only fixed expenses for bald living. Despite this fact, its development maintained that a consumption of financial sources rather reflected the global MoD budget rather than the real needs of military troops or other MoD institutions for bald living. In comparison with the other categories, it is obvious some types of expenditures were included into this one (probably wrongly, regardless of fulfilling given tasks). It implies a system of activities held rather unconvincing data about legitimate demands for a consumption of public sources.

It could be an adequate reason for the optimization of MoD expenditure monitoring with usage of functional spheres (partially similar in their content).[1] Table 1 presents quite considerable differences which were well-founded by the Activity group development in observed years. As you can see, some of them copied the MoD budget development in direct proportion, especially in a period from 2008 to 2010 (in comparison to 2008, the amount of spent financial sources increased in 2009 and it went down in 2010). For instance, the most effected groups were **Centrally planned MoD - wide activities** or **Troops and reserves training** (differences and decreasing). There is also a case of a positive financial development, for example **Command and Control** group. As a second point of view, we can also see the smallest difference is between financial sources of activity groups in years 2006 and 2009 (data confirm the biggest similarity in all Activity groups in mentioned years).

[1] According to article 20 in Command of the Minister of Defense 24 in 2010 (Planning of the MoD activity and progress), functional spheres were based on DOTMPLFI method (D – doctrines, O – organizational structure, T – training /including an educational system and behavioral cultivation/, M – material /military equipment, outfit and other material fittings/, L – leadership, P – personnel /including a need of recruitment/, F – facilities /including real estate/ and I – interoperability /a capability of the collective operations/).

Nevertheless, there is no chance of saying how much is enough when we do not have clearly given goals and tasks and measurable indicators for their fulfilment. Nobody can guarantee a level of requested capabilities. It supports the WPD idea of improvement of the system of economical management markedly, focusing on the system of stable preferences with elimination of possible wasting of money and supporting fulfilment of given goals.

2.3 SYSTEM OF GOALS AND FINANCIAL SOURCES DEVELOPMENT

The method of the Management by objectives helps to implement the system of the strategic goals in MoD conditions. The first attempt was performed in 2010. It brought minimally two positive things. The first one was that the MoD more accepted a deeper connection between tasks and money (through a set of evaluable criteria focused on the quantity and quality measures). The second one was a closer usage of effectiveness, economy and efficiency principles (it is possible to analyze different variants and choose the optimally assessed way). The relation between strategic goals and financial sources in 2010 is expressed in table 2. This table also emphasizes real changes in financial sources allocation between a planned state and a final consumption during a fiscal year.

Strategic Goal Name	Appointed Budgetary Specification (ABS)	Final Limits of Financial Sources (FLFS)	Consumption of Financial Sources (CFS)	Change between ABS and CFS (in %)
	(In CZK million)			
The Functional System of The National Defence	7 866,468.0	9 722,030.6	9 635,803.6	22,49
Embattled and Interoperable Forces	837,820.0	1 608,966.9	1 569,644.2	87,35
Modern Organization, Management and Command	2 613,515.0	2 650,188.3	2 535,617.6	-2,98
Qualified and Motivated Personnel	6 978,311.0	6 984,900.2	6 772,490.1	-2,95
Deliberate Modernization and Modern Infrastructure	9 136,352.0	11 341,881.4	10 939,228.6	19,73
Personal Mandatory Expenditures	14 143,564.0	15 167,600.3	15 151,159.7	7,12
Current Life Support	3 737,748.0	4 261,704.0	4 241,018.2	13,46

Table 2 - The MoD expenditures diversification into the strategic goals in 2010
Sources - Created by author.
Data was taken from the Financial Information System (FIS) as an output of database in 2010.
Data is attainable on internal network of FIS website (http://www.fis.acr).

We can notice that the change between ABS a CFS achieved almost 20 % in three cases. Moreover, in the case of **Embattled and Interoperable Forces,** the difference was more than 80 %. It inferred an inaccurate financial estimation of real task fulfilment (applying especially to combat training or agglutination of combatant forces). Similar mistakes can be uncovered, because the system was tested firstly. Differences were considered again during a preparation for the next planning and budgeting cycle. The greatest differences also show the greatest priorities of related strategic goals (financial sources allocation steeply increased).

We can notice that a method of Management by Objectives was not accepted fully, especially in the matter of personal mandatory expenditures (PME) and current life support (CLS). PME should be included in every goal which is fulfilled by MoD staff.

Expenditures allocated into CLS have a sense in case that an element of the organizational structure provides minimally one appointed goal. Therefore, PME and CLS should not be perceived separately but they should be included into relevant goals (to make a sense in Management by Objectives system). To say more about the implementation process, the Strategic Goals System was set up by the MoD top-management and approved by the Minister of Defence (in MoD planning guidance). During budgetary preparation, every strategic goal was elaborated into the framework of the lower level goals. This framework was worked out into more detailed measures and tasks. It created conditions for financial sources allocation in factually detailed specification in reliable calculations. Every competent manager (Deputy Minister) propounds documentation for the strategic goal filling (as an appointed part of MoD budget proposal). Management by Objectives should bring a larger objectification.

CONCLUSION

The necessity to stabilize both MoD budget development and CZAF capability progress arises from non-optimistic financial sources development and their unbalanced diversification for goals and tasks (described in part 2 and 3). You could see 3 outputs relating to financial sources allocation – financial (three basic expenditure categories), factual (the Activity list system) and objective (strategic goals allocation with measurable indicators for their fulfilment). There exists a movement from financial to the factual point of view in direction to system of objectives. It also seems the MoD prefers more effectiveness and economy than efficiency (it shall be balanced). The financial point of view cannot give enough information for decision making. The long-term used factual system (activities) was finally cancelled and replaced by the system of Management by Objectives. It is obvious that an improvement of the economic behaviour needs advancement (with regards to the state exchequer system).

MoD budget preparation needs a fully functional system of planning and budgeting which will be cohesive in its segregate phases. It will make it possible to have:

- Well-balanced and effectively allocated sources for achievement of requested capabilities;
- Transparent tool for apology of the adequate amount of money for the MoD budget to fulfil national and international defence level goals and tasks in face of the Czech government.

That was why the MoD Board for Planning ordered to analyze regulations and processes of planning (to implement WPD). It brought affirmation the MoD will prepare (in a short time) an adequate methodical support of mid-term and short-term planning processes and capability progress. It should bring a recipe how to minimize negative impacts of the expected critical shortage of financial sources as sufficient compromise between state budget savings and acceptable national and international security level. A very debatable question is whether CZAF will obtain enough stability minimally for the sustainment of requested capabilities.

Bibliography references

[1] Command of the Minister of Defense number 24, Prague: Ministry of Defence, 2010 *(Planning of the MoD activity and progress)*, electronically achieved on internal network of the *Staff Information System (SIS)* website *(http://www.sis.acr)*, part EPINAV (available for members of the Ministry of Defence and of the Czech Army with an adequate approval).

[2] DOSKOČILOVÁ, K.: *Budget – Facts & Trends 2010*, Prague: Ministry of Defence, *and 978-80-7278-545-2*, electronically achieved on *http://www.army.cz.*

[3] DOUBKOVÁ, J.: *Budget – Facts & Trends 2006, 2007, 2008 and 2009*, Prague: Ministry of Defence, *2006 to 2009, ISBN 80-7278-334-3 (2006), 978-80-7278-398-4 (2007), 978-80-7278-458-5 (2008), 978-80-7278- 504-9 (2009)*, electronically achieved on *http://www.army.cz.*

[4] *Jane's defense weekly*, 2010, volume 47, number 43, electronically achieved on *http://www.jdw.janes.com.*

[5] MANDYSOVÁ, I.: *European monetary stability versus regional governments*, In Economics and Management, 2010, number 2, Brno: University of Defence, ISSN 1802-3975.

[6] Outputs of database in 2010, taken from the *Financial Information System (FIS)*, Data are attainable on internal network of FIS website *(http://www.fis.acr)* (available for members of the Ministry of defense and of the Czech Army with an adequate approval).

[7] RASMUSSEN, A. F.: *Security Policy in an Era of Budgetary Scarcity,* In European security and defense, 2010, number 3.

[8] ŠTANCL, L.: *The armament industry in conditions of globalization*, In Economics and Management, 2009, number 2, Brno: University of Defence, ISSN 1802-3975.