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Ladies and gentlemen,

We are honored and truly overwhelmed to present you with the first issue of the *Journal of Defense Resources Management*, edited and published by the Regional Department of Defense Resources Management Studies (Brasov, Romania) through its Scientific Research Center in the field of Defense Resources Management. The simple, but suggestive journal title reflects the very core of our professional preoccupations.

The moment chosen to launch the journal's first issue from what we hope to be a long series is a special one, for it marks a milestone in our institution's life. This is the day when we proudly celebrate the 10th anniversary of DRESMARA's official opening, which took place on September 25, 2000.

In the ten years that have passed since our organization was established, we have gained the teaching/learning two-fold experience, as we are convinced that education is a dynamic and lively process, in which the interactive approach is of paramount importance. The mutual exchange of knowledge and personal experience of each party of the activity – teaching staff, as well as course participants – represent the fundamental dimensions of education in our institution. Our motto – “*consensio per erudio*” – is what governs our endeavors. Today's world realities – dominated by permanent change, uncertainty, non-conventional threats, economic, cultural, political, and military challenges – make the alteration of knowledge and thinking patterns be absolutely critical. Consequently, static approaches become superfluous, whereas creativity, flexibility, and adaptability become priceless in building consensus.

In the light of the above aspects, we consider that initiating a journal that concentrates and materializes our interests is a genuine necessity. We intend that this new *Journal of Defense Resources Management* gather the research activity of prestigious names in the field, both from Romania and from abroad. Furthermore, we are honored to have received positive replies to our collaboration invitation from numerous experts, who have trusted and supported us in our efforts to commence a project that hopefully will be long lasting and prestigious at the same time.

We shall conclude this succinct foreword by expressing our gratitude to all the professionals that stand and will stand by us now and in the future, so that our journal will gradually become, by hard work and perseverance, a reputable name in the specialized literature of defense resources management. That is why I would like to take this opportunity to wish every success to all the people involved in this common undertaking.

LTC Florin Grosaru
Commandant of the Regional Department
of Defense Resources Management Studies

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HUMAN RESOURCES MANAGEMENT EDUCATION - FROM OPERATIONAL CONCEPTUALIZATION TO THE MILITARY SYSTEM'S TRANSFORMATION

Teodor FRUNZETI

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Abstract: *The strategic environment underwent significant alterations having to do with the nature and typology of risks, both globally and regionally. Therefore, military policies and strategies have altered significantly, that is, passing from risk-based defense planning to capability-based defense planning. This calls for the development of a robust modeling and simulation architecture of the military systems for educational and training purposes in order to achieve short-, medium-, and long-term capabilities. The accomplishment of an education and training architecture at a joint and inter-agency level permits the analysis and confirmation of solutions for functional fields.*

Keywords: *symmetrical and asymmetrical war; threats, non-state actors, military education and training, new concepts development*

After the end of the Cold War, the disappearance of the bipolar system resulted in the need to transform the military system in the sense of developing new capabilities to maintain the military actions' degree of success. The 90's allowed for the introduction of new operational concepts and initiation of a deep process of restructuring the military systems of NATO and former Warsaw Pact, which was later acknowledged as a Revolution of Military Affairs (RMA). This process was determined by three main factors: the dynamics of the strategic environment, the

technological progress, and the increasing complexity of the conflict and military actions.

At the end of the 90's and after the 9/11 events, the strategic environment underwent significant alterations having to do with the nature and typology of risks, both globally and regionally. Therefore, military policies and strategies have altered significantly, that is, passing from risk-based defense planning to capability-based defense planning. In other words, overcoming a wide range of risks and atypical threats called for a modular military system, which was both agile (able to perform

various missions in non-conventional combat environments) and flexible (able to change its operational structure according to enemy types).

At the same time, technological progress influenced organizational dynamics, including the military ones. Fast developments in communications, regional and global economic strategies and media led to the need to interconnect worldwide. From the military organization's point of view, technological progress, trends in global dynamics and crises variety (including natural disasters and inter-ethnic conflicts) resulted in a fast process of transformation. Thus, the military organization adapted to what experts called *informational revolution*. In this context, political and military strategists and decision-makers admitted the necessity to develop, analyze, confirm, and implement new operational concepts such as Net-Centric Warfare (NCW).

NCW is an RMA specific concept stemming from the fundamental changes occurred in contemporary western societies, particularly in the economic, technological, and informational fields, for instance: variations in the network based platform type C4, differences between the independent vision (action) and the one specific to a complex dynamic system in permanent adaptation, and the increasing importance of strategic options for adaptation and survival within changing systems [1]. NCW is based on integrating information collecting and processing systems (sensors), command and control systems, and weaponry systems (combat platforms) into real and virtual networks. This type of war

ensures fast leadership cycles, so that the discrepancy between information and hitting is reduced to a maximum, and reaction is therefore instant. Consequently, NCW is a modern type of war, which involves C4I2SR systems organized in a central network, a sensors network, and a combat network, which use information technology, high-tech weaponry systems, and outstanding technical capabilities [2].

The NCW concept has been criticized by the fans of another new concept specific to contemporary military sciences, that is, *the 5th generation war*. This type of conflict, first examined in the 1999 article "The Changing Face of War: Into the Fourth Generation"[3], displays features such as blurring the lines between the political, the military, and the civilian, and involves elements such as: high complexity and duration; terrorism; highly decentralized transnational base; direct attack upon the enemy's culture; complex psychological war by media manipulation; the use of every type of available pressure (political, economic, social, and military); the implication of every network's actor in a low intensity conflict. This concept was criticized in the sense that it was considered as simple insurgency, and the analysis pattern of generation based wars was regarded as inefficient in the identification of occurring changes [4].

Currently, one may talk about *the 5th generation war*, which puts into perspective the aspects of the previous generation. The 5th generation war is exclusively a war against non-state actors [5]. In this type of war,

the center of gravity is no longer a great leader of the enemy who can be killed, nor is it an army that can be destroyed. For instance, whereas the Islamist radical organizations are fragmented, they become more and more dangerous, because it is not their combat capacity that disappears, but their mass and center of gravity that can be hit. The 5th generation war involves spontaneous and anonymous attacks by terrorists against random targets (civilians and military personnel) in order to generate confusion and fear [6]. This concept is not yet fully developed, but it is obvious that it is a product of the new technologies, i.e., of the present RMA stage.

Actually, both the 4th and the 5th generation warfare are *dissymmetrical and asymmetrical wars*. On the one hand, there are high-tech powers, and on the other hand there are the antinomy entities that aim for the latest technologies, as well as the preservation of conservative or retrograde attitudes [7]. Theoretically, *dissymmetrical wars* refer to two completely different forces, disproportionate and incompatible, when only one can attack the other (or when neither can act against each other) [8]. On the other hand, *asymmetrical wars* involve two completely different forces that act efficiently against each other [9].

The aspects of dissymmetry and asymmetry are often reduced to terrorist wars and the war against terrorism. The world's entire conflict situation – military or non-military – unfolds within this spectrum, in which the three dimensions overlap

sometimes according to some strict rules applied ingeniously or chaotically. Somewhere between the preciseness of rules established from the first wars, and the lack of preciseness and predictability of fusions, evolutions, and evolutions lies the whole art of confrontation, as well as crisis management [10].

It is, therefore, natural, that the high degree of complexity of the military conflict determines major requirements regarding the military capabilities' transformation. Political, social, or economic crises have directly impacted upon the occurrence of regional crises that required the use of the military tools. The "conventional" conflict from the Gulf of Persia at the beginning of the 90's was already perceived as an atypical one for the year 2000. At the same time, the conflict socialization (the Balkan and the former Soviet Union crises) and the emergence of trans-national risks and threats have resulted in the need to elaborate new operational concepts and to develop new capabilities at joint or inter-agency level. In order to identify the capabilities required by a certain set of missions and objectives, the military force's development process is based on a joint system of capability development and integration. This encompasses several stages, starting from the strategic documents level and ending at the documents giving a thorough definition of the required capabilities. The process of concept development and experimentation depends directly upon the joint system of capability development and integration by means of the two main approaches: concept development

and experimentation.

The defense strategic or planning guidelines aim to define the short-, medium-, and long-term objectives, as well as to identify the operational concepts that strengthen the military system with regard to certain missions pertaining to the successful use in military actions. After the definition, analysis and confirmation of operational concepts, the functional concepts and integrated architecture are delineated. This stage is necessary in order to establish, in an integrated and formal framework, the military organization's subsystems' responsibilities on functional fields. Every operational concept is subjected to an analysis process concerning its relevance and efficiency. The analysis implies the determination of the capabilities related to each operation concept on short-, medium-, and long-term. These are then changes into functional requirements, and lead to the initiation of a deep process of identifying solutions for each functional field. Both the functional solutions and concepts determine the elaboration of documents regarding the development of military capabilities, and of those related to the alterations in implementation fields (doctrine, organizational structure, education and training, equipment, leadership, personnel, and infrastructure).

Permanent experimentation is the balancing factor between the deductive character of concept development and the inductive character of prototype development. This calls for the development of a robust modeling and simulation architecture of the military systems

for educational and training purposes in order to achieve short-, medium-, and long-term capabilities. Moreover, experimentation must take into consideration the new technological progress in order to identify and develop procurement programs that allow for endowing the military structures with efficient equipment. The accomplishment of an education and training architecture at a joint and inter-agency level permits the analysis and confirmation of solutions for functional fields. Also, applying new technologies allows ensuring a high rate of success in military actions. Structured mainly on modeling and simulation, permanent experimentation implies building operational models that need confirmation and empirical arbitration in order to determine the efficiency of the new military capabilities. Real, virtual, or constructive simulation allows repetitive and low-cost training under the circumstances of the integrated application of new techniques, tactics, and procedures.

In the context generated by the Euro-Atlantic organization membership, antiterrorist operations, multinational actions unfolded in special conditions (desert, extreme temperatures, jungle, populated areas with various degrees of economic-social development or cultural differences) will prevail in the wider context of the potential confrontations faced by Romania's Armed Forces in the near future.

Starting from the premise that future military conflicts, regardless of their nature – *self-defense, alliance, or coalition wars* – will be characterized by military forces downsizing,

forces' rapid deployment to decision points, joint and multinational operations, rapid reaction, we consider that Romanian Armed Forces' mission accomplishment depends on an appropriate approach to their endowment, according to the requirements imposed by the modern warfare and action types.

Naturally, the endowment requirements vary according to the confrontation envisaged. Thus, in the case of symmetrical conformation, the endowment strategy must confer the forces capacities of tri-dimensional, dynamic, pulsating, non-linear, multidirectional, highly automated, and digitized action, at least at the level of basic cell. During asymmetrical conformations, the characteristics required by the crisis situation, as well as the stability and support operations must offer optimal conditions to create operational points and structure downsizing.

To conclude, we express our belief that the transformation process is a perpetual one. In this sense, the military system must develop methods to allow for its self-assessment, as well as for the assessment of its systems that define the required military capabilities. At the same time, the process must validate capabilities by considering the solutions according to implementation fields (doctrine, organizational structure, education and training, equipment, leadership, personnel, and infrastructure), and ensure the endowment with equipment and technology needed to secure mission accomplishment.

By extrapolation and with strict application to the military educational system, mention should be made that

practice in commanding military structures is based mainly on the previous experience in education, when it comes to founding military education and training. I should reiterate that the curriculum has been revised for every stage of military education – graduate, postgraduate, master and PhD programs, as well as for every type of course we provide in order to align the educational approaches with our beneficiaries' (the services and the Major Staff) needs and expectations. More precisely, we are talking about the increasing practical character of education and the focus on developing the skills and abilities which officers should have from the battalion level upwards. Also, one should note that the teaching activity efficiency has been envisaged, so that the teaching staff are better prepared and closer placed to the beneficiaries' needs, that is, the realities of the modern battle field.

However, in no form of education and in no college is the graduate – the end result of the process – prepared to perform every role the career will entail in the future. Any educational institution provides a general framework, and implements and algorithm which the graduate must be able to follow.

Our university has a graduate profile appropriate only for the military educational establishments and revised on a regular basis. In other words, we establish what he/she needs to know, to do, and to be. Hence, the curriculum and the syllabus are developed. It is true that the educational process unfolded here offers models and exercises. No

one should expect that a graduate is able to do and to know everything from the very beginning. Academic education must be followed by the graduates' on-the-job training, which must materialize the general academic framework. The graduate will perform some tasks when commanding a battalion, and totally different tasks in a division or a service major staff. Our educational process is based on practice and experimentation, conducted by professional teaching staff, but no one should expect that a graduate must be able to integrally do any job. As a result, the graduates' commanders and superiors ought to continue their specific training, in accordance with the positions they fill.

To conclude, we support quality, which should be a constant dimension of our activity, which refers both to education, and military training. These are the elements we have in mind in order to achieve NATO interoperability, which is one of the pre-requisites of Romanian Armed Forces' mission accomplishment.

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**ADVANCED DISTRIBUTED LEARNING (ADL)
PAST, PRESENT AND FUTURE
IN THE REGIONAL DEPARTMENT OF DEFENSE
RESOURCES MANAGEMENT STUDIES
EDUCATIONAL ENDEAVOUR**

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***Abstract:** Throughout the years, Advanced Distributed Learning (ADL) became an important part of DRESMARA's teaching and education programs. This paper presents an overview of the past and present ADL related initiatives that took place in DRESMARA, along with a short analysis of key issues related with ADL implementation. Also presents the content of a typical online complementary package that provides all the needed support for a resident course. In the end presents the latest developments and efforts to bring innovative and effective methods, practices and technology to the NATO Alliance and the Partnership for Peace Program, in order to enhance education and training initiatives and enrich DRESMARA's course offering.*

***Keywords:** Advanced Distributed Learning, e-learning, learning management system, ILIAS, information system.*

Today, when we celebrate ten years from the initial establishment of the Regional Department of Defense Resources Management Studies (formerly known as the Regional Center of Defense Resources Management), we must not forget the beginnings of our educational activity. With the outstanding support of the United States of America, during November – December 2000, a Defense Resources

Management course was conducted at DRESMARA, by experts of the Defense Resources Management Institute of Monterey, California. This event was the first one that contributed to the establishment of a modern view of DRESMARA's teaching staff on how to carry their further didactic activity.

During 2000-2005 the teaching and leading staff applied in DRESMARA's resident courses the most modern and interactive educational methods and techniques

which they got in contact during the specialization courses attended abroad, as part of their personal development. They also start thinking on the advantages of one method highly used by the military educational institutions attended by our staff - the Advanced Distributed Learning (ADL). Even if *“Good teaching is good teaching, no matter how it’s done”*, the Advanced Distributed Learning or e-Learning brings with it new dimensions in education.

The first DRESMARA’s ADL related initiative took place in 2004, when a ***“Partnership for Learning Pilot Program (PLPP)”*** was organized and conducted in collaboration with the Canadian Forces Language School, with the support of the Romanian Human Resources Management Directorate. The activity consisted from an on-line English Language Course using videoconferencing, held between 18 October - 12 November 2004 and part of the Military Assistance Training Program (MTAP).

The parties involved were two Canadian instructors, the participants to the second and third series of DRESMARA’s resident English Language Course on Management and NATO Terminology, DRESMARA’s English teaching staff, along with the IT compartment’s personnel. The activity was highly appreciated by the course participants.

All of them stated that the on-line course was a great addition

to the resident one, demonstrating the power of this newly type of education for enhancing participants’ knowledge.



In 2006, having in mind that the Regional Department of Defense Resources Management Studies technical infrastructure was designed to facilitate the implementation of ADL support to resident courses, DRESMARA’s leadership decided to investigate the possibility of adding e-Learning technology to its educational capabilities and services. As a consequence, the personnel of the Information Technology compartment and not only started to seek best ways to get things done.

We studied some key issues related with ADL implementation, such as:

- fundamental theories and concepts: distance learning, advanced distributed learning, on-line learning, web based training;
- teaching and learning processes based on information technology, including: instructional design, digital content development, pedagogical aspects, adult education

learning;

- e-Learning systems: learning management systems (LMSs), learning content management systems, authoring tools for content development, contents standardization (SCORM);

- national educational laws and ADL principles;

- best practices and lessons learned in NATO and PfP Consortium, Romanian and foreign military and civilian institutions, private sector.

In the process, we based our thinking on our general educational and training objectives, on DRESMARA mission, and the military and civilian educational and training frameworks.

Of great support was the previous experience with Blackboard, a commercial LMS, that revealed us the strengths and weaknesses of using ADL to enhance the traditional educational process. We carefully weight various learning factors to be able to determine which learning components can be blended together to make a learning program more effective.

In this respect, the classroom experience is good for the participants, because their motivation increases due to face-to-face interaction between them and the teaching staff as well as the between themselves and the instructors are more responsive to individual concerns or particular questions. A self-paced online approach gives learners the flexibility to learn

anytime and anywhere, and allows them to select learning materials that meets their level of knowledge or interest to perform more effectively in their particular professional activities. On the other hand, a self-paced online experience could easily become frustrating because Internet connection bandwidth issues restrict the usage of rich presentation options and hamper the interactivity.

In the last four years, with the initial support (in terms of technical assistance, instructional design and guidance of using LMS) of the Advanced Distributed Learning Department within the National Defense University “CAROL I”, we developed a complementary online support package for each of the resident courses that are part of DRESMARA’s educational offer.

DRESMARA’s distributed network capacity (technical infrastructure) consisting of hardware, software and communications infrastructure, learning management systems, software and content development authoring tools offer us the possibility to deliver both synchronous and asynchronous educational support services.

Our current aim is to provide participants a comprehensive online support package in conjunction with resident courses, so they learn not only essential but detailed information. This ensures the possibility to have a greater foundation of knowledge in order to make resident classes more productive and effective.

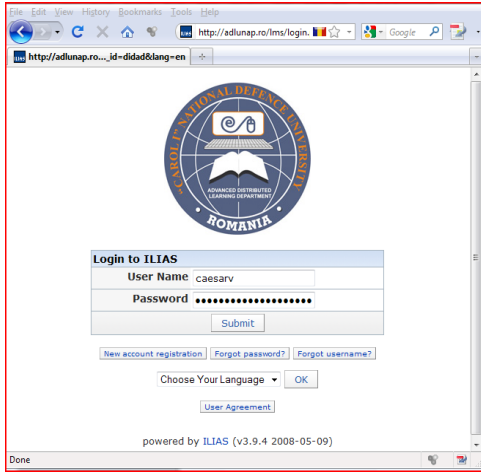


Fig. 1. The ILIAS portal logon screen.

The Learning Management System is an open-source named ILIAS, specifically designed to manage digital SCORM conformant courses and “powered” by the Advanced Distributed Learning Department (figure 1).

It is an open-source application widely used by various educational institutions, especially in the military field, already tested, working properly and having constant support consisting of version updates. It is important also to mention the big group of users of this application, which is giving the possibility to share the gained information and practical experience.

As of today, the Information Technology Compartment and the Faculty members have developed seven complementary online support packages that are constantly updated and developed, to ensure that course participants receive the correct

information in order to successfully complete their resident classes (fig 2).

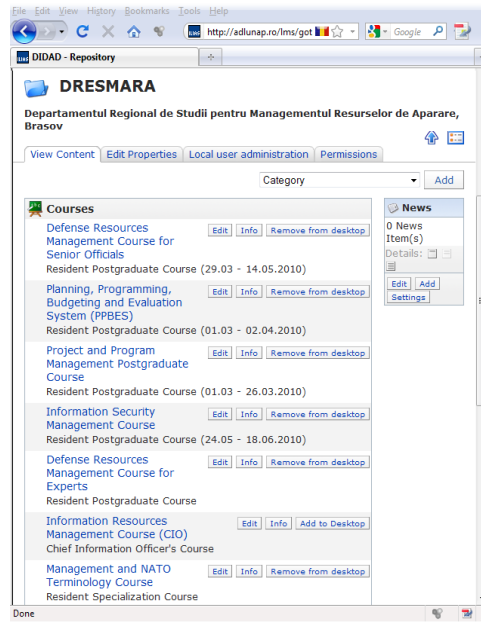


Fig. 2. DRESMARA’s complementary online support packages.

The content of an online package provides all the needed support for the resident course and typically contain the following items (the order can vary) (fig. 3):

- a) Weekly Schedules;
- b) Course related Resources - lectures, presentations, web resources (movies, video clips), glossaries, readings;
- c) a Discussion Forum - an area to introduce yourself, your organization, and interests regarding the course; also for free discussions and collaborative tasks;
- d) Weekly Course Critiques;
- e) an Educational Process

Evaluation Questionnaire - the questionnaire is anonymous and aims to identify the graduates' level of satisfaction regarding the main educational services offered by DRESMARA; the answers are analyzed in order to find solutions to improve the activity;

- f) Graduation Papers of former participants;
- g) Graduation Pictures of former participants.

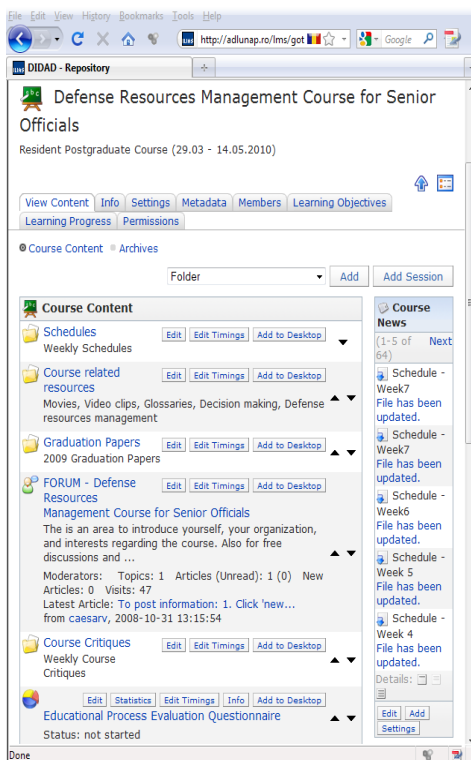


Fig. 3. The content of the complementary online package for the resident Postgraduate Course “Defense Resources Management for Senior Officials”.

Through the use of ADL online support package for each of the resident courses, we effectively engage our community members (teaching staff and course participants) during and after classroom courses. The participants are better prepared for the traditional next day's classroom based classes when they review pre-reading materials or communicate with course directors via a learning management system ahead of time.

During syndicate practical exercises, the work has adapted to use of our LMS utilities to share information and discuss scenarios in innovative ways. Another positive aspect is that we no longer have to burn so many CDs for participants, because after graduation the course content is available anytime and from anywhere via our LMS portal. Participants' opinions on using the LMS had been positive and Faculty members are considering more and more the ADL activities as important support tools for traditional classroom methods.

During the last four years, the PpP Consortium Advanced Distributed Learning Working Group (ADL WG) meetings helped us to keep in touch with the latest developments and efforts to bring innovative and effective methods, practices and technology to the NATO Alliance and the Partnership for Peace Program, in order to enhance education and training initiatives and enrich DRESMARA's course offering.

After a two year effort, as a tangible result of discussions between members of DRESMARA Information Technology (IT) Office and NATO School ADL Office, held during several PfP ADL WG meetings, we are about to sign a memorandum of Understanding with NATO School from Oberammergau, Germany regarding the use and update of the “*Resource Management in NATO*” online course.

The online course will be co-developed by both parties and will benefit the Alliance and Partner Nations and support the aims of the NATO School and DRESMARA. The course will start in spring 2011 and will disseminate Defense Resource Management knowledge and experience among interested participants.

We are also currently exploring the possibility to create a future

virtual environment as a hub for our alumni, teaching / leading staff, and possible emergent community of practice to informally discuss and comment on work during and after their DRESMARA residency.

In conclusion, despite the initial little support for this domain from the military educational decision makers, partially generated by issues such as the recognition of e-learning and its credibility as a non traditional way of learning, infrastructure problems, lack of appropriate training personnel, etc. we manage to keep our minds open to new challenges and new ways of doing things.

Throughout the years, ADL has become an important part of DRESMARA’s teaching and education programs. In this development process, we found out that lifelong learning objectives can be best achieved when resident courses and online packages are developed to complement each other.

THE CHALLENGE AND BENEFITS OF USING PROJECT MANAGEMENT PRINCIPLES IN MILITARY EDUCATION: WH-QUESTIONS AS QUALITY CATALYSTS

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Abstract: *The present coordinates of the world we live in pose various challenges, amongst which education is an essential one. When approaching military education, the effectiveness of the courses and training processes can sometimes make the difference between life and death.*

The hereby article argues that a pragmatic business-like approach to implementing new educational programmes in the military may contribute significantly to increasing the usefulness of the courses provided within the system. More precisely, the author sustains the idea of addressing questions such as why or what is needed, and particularly who is involved and who are the beneficiaries of these programmes.

Keywords: *military education, project management, course implementation, resources, customers, communication.*

1. INTRODUCTION

Today's business environment is dominated by rapid and continuous change, which has resulted in reshaping organisational approaches in order to enhance their performances or "agility", which means "not only to react quickly to changing technology as well as changing markets, but also to be responsible for technical and market change" (Hauschildt and Schewe 2000, p. 96). In achieving this goal, project management holds a privileged position as it combines the present organisational

tendencies – delayering, teamwork, flexibility, employee participation, entrepreneurialism (Teare and Monk 2002) – for the purpose of "bridging the gap between the vision of the future and the current reality" (Dolan and Garcia 2002, p. 109).

This paper argues that the application of the basic principles of project management may contribute to the successful implementation of a new educational program even in the context of a military establishment, which is traditionally regarded as pyramidal and less permeated with creativity and initiative.

2. FUNDAMENTALS OF PROJECT MANAGEMENT – A SUCCINCT LITERATURE REVIEW

According to Meredith and Mantel Jr. (2000), “a project is usually a one-time activity with a well-defined set of desired end results” (p. 9).

The nature of this project can be juxtaposed to Balachandra’s (2000) view, according to which one must consider the project management “contextual variables”, that is, the nature of the innovation – incremental or radical, the nature of the market – existing or new, and the nature of technology – familiar or unfamiliar.

In establishing the project purpose, clarity is a crucial prerequisite for “to deliver a project well we must understand why it is needed and what it is for at the start of the planning process” (Webster 1999, p. 241).

In this phase, the commander should act as the main internal change agent and establish “a managerial infrastructure” (Dale and Cooper 1994) to facilitate the project initiation. Also, the importance of this “why phase” (Webster 1999) cannot be overstated, because lack of clarity results in “significant amounts of expensive rework which emerges well into the project implementation phase” (Webster 1999, p. 240).

Although Lock (2001) argues that time, budget and quality are project objectives because failing to meet them affects the project effectiveness, the organisation’s approach may

follows Webster’s (1999) view, according to which time and budget answer the question “*how should the project be done?*”, whereas people represent the ones “*who should be involved*” in it.

The project is initiated by considering what Cicmil (1997) identifies as “project context”: stakeholders, end-users, and risk factors. Thus, the stakeholders are the members of the departments, sections, or divisions, because a collective effort is necessary to ensure the project success. The end-users are the students for the course has to meet their needs and expectations both in terms of compatibility with their previous knowledge and in terms of relevance to their future perspectives. The risk factors may occur when that the course is a new enterprise, and consequently no prior experience or feedback is available.

The project manager should be given autonomy to approach the task, which results in two positive aspects: project manager’s empowerment on the one hand, and enhanced organisational communication on the other hand, which are seen as essential motivating factors (Roehling 1997). Thus, the potential negative effect of the senior management’s interference and exercise of power (Elangovan and Xie 2000) is overcome, and the project manager perceives the task as a challenge and opportunity to exert personal and expert power with “positive effects on subordinates’ commitment, satisfaction and performance” (Cheng 1994, p. 55).

In terms of identifying the end-users' needs and expectations, as well as minimising the risk factors, the following steps may be taken:

the students' selection criteria are analysed in order to evaluate their acquired knowledge level and subsequently to adapt the course difficulty level;

in order to maximise the compatibility between all the course modules within the overall curriculum and syllabus discussions are initiated with all the teaching staff;

the course should also be regarded as a facilitator in the new learning environment, fostering a positive attitude among colleagues, tutors, and educational process. As a result, the teaching materials have to focus on case studies, quizzes, discussions, whose purpose is to enhance communication and team/group work skills as well as to create a friendly and open classroom environment. As studies (Ingram et al. 2001) reveal, the teaching process is more effective when it involves simulation, interaction, and participation because the skills and attitudes learned through these approaches help individuals to become reflective practitioners interested in lifelong learning.

During these stages, the project manager closely collaborates with the members of the teaching department, whose opinions and feedback are used in order to decide upon the course contents and optimal teaching techniques and objectives. The most used collaboration methods are informal meetings and unplanned

discussions, which help to prevent the "three key sources of team conflict: disagreements over goals and priorities, personality clashes, and communication problems" (Gent et al. 1998, p. 254). Thus, the preparatory phase of the project is finalised, and the project background information is gathered.

The next stage may be identified with Cicmil's (1997) "project content", which involves details regarding the scope and constraints of the project. In this context, corporate communication plays a pivotal role in clarifying the course requirements as it facilitates the ability to "appreciate multiple viewpoints, work with multiple stakeholders, be flexible and pragmatic, take risks and be innovative" (Steiner 2001, p. 151).

Mention should be made that during the entire process, the project manager informs the senior management on the progress of the project. One may regard this as a restriction to employee empowerment with negative effects on staff motivation considering that "the old model based on the hierarchical control of employees must unquestionably evolve" (Dolan and Garcia 2002, p. 101). However, experience has proved that the leader's monitoring role is critical in project management, and "the commanding or directing role must be done, however euphemistically or surreptitiously" (Fells 2000, p. 347).

As far as the project constraints are concerned, they are represented by cultural differences and time.

At this stage, interdepartmental communication and collaboration play an essential role because performing these final steps involves various departments such as IT and Logistics, which are simultaneously performing their specific day-to-day tasks. However, in a team-based organisational culture, the stream of work runs smoothly, and no significant obstacles occur. This illustrates that if the “what” and “how” questions are clearly addressed and sustained by an appropriate organisational culture, barriers associated with project management can be overcome (Dealtry 2001).

Once all the pre-requisites have been ensured, the final stage of the project may be approached: the testing phase. Ideally, the project manager should run a simulation course in order to obtain a primary feedback on it. Simulation is the most effective learning method, and the project manager uses it in order to test the outcome and to discuss its impact upon the course participants. Consequently, the final clarifications and adjustments are made in connection to both the course contents and the teaching techniques.

In terms of communication tools, the process effectiveness is achieved by informal discussions which are preferred by high cooperation teams and have a positive impact on team members’ motivation and participation (Gent et al. 1998).

As far as the project evaluation is concerned, Tuckel and Rom (2001) argue that it is stated in terms

of meeting three basic objectives: time, budget, and quality. The first two criteria are easy to quantify or measure. As far as the quality condition is concerned, two assessment tools may be used: the course critique forms that the students fill in anonymously at the end of the course; the number of students that will maintain contact and develop professional projects with the project manager after the course completion, which may be considered as a token of their course satisfaction.

3. CONCLUSIONS

In order to assess the course’s contribution to the overall organisational performance, one should consider criteria such as staff motivation (who with?) and customers’/students’ satisfaction (who for?).

The former results from personal observation reveals a high level of morale, participation, communication, and collaboration, which represent the key success factors of the project presented in this paper. The latter is illustrated by the students’ comments and ratings carried out upon course completion.

Another determinant factor of the project success proves to be the constant focus on meeting and exceeding the students’ needs. This must be an essential element of the organisational culture and is widely regarded as a vital ingredient for achieving and sustaining competitive

advantage (Ma 2003).

As Tuckel and Rom (2001) state, there is a “desperate need to integrate project management tools and techniques with a broad customer driven process” (p. 401).

Consequently, the project examined in this paper is meant to be but the first step of an ongoing process of improvement and development based on the students’ feedback and the project manager’s experience and personal observation. One may view this aspect as a contradiction of the project defined as a “one-time activity”, but this paper argues that this initial perspective should be used as a foundation, and complemented by Cleland and Gareis’ (1994) approach, according to which projects must lead to improvement using limited resources as a sine-qua-non for maintaining competitive advantage. Given the present requirements and challenges that the cadets must face in various theatres of operations worldwide, the educational component must enjoy the military leaders’ full attention, accompanied by concrete steps towards continuous modernisation, flexibility, and adaptability.

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THE PLANNING, PROGRAMING, BUDGETING SYSTEM AND ITS IMPLEMENTATION IN THE SERBIAN MINISTRY OF DEFENSE

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Abstract: *The main purpose of introducing the PPBES to the Serbian Ministry of Defense and the Serbian Armed Forces is to provide a rational management of resources and to maintain and build capacity of the Ministry and the Serbian Armed Forces in order to achieve their goals, objectives and missions.*

Expected results of implementation of the PPBES are reflected in increasing the efficiency and rationalization of the defense planning to a higher level, ensuring compatibility with defense planning and budgeting system of the state and developing a foundation for the effective management of defense resources.

Key words: *planning, programming, major programs, program managers, budgeting, evaluation.*

The current state of the defense system of Republic of Serbia defined ways ahead of its development, created the necessity for implementing a different financial and planning system for the defense. Other countries' experiences and determination of the political and military structures have influenced the Serbian Ministry of Defense to start with the implementation of the planning, programming, budgeting and execution system (hereinafter: PPBES) in the year of 2010. The will to implement such kind of planning and to use available resources, comes from the desire to use them in best possible way, in order to avoid unnecessary overlaps between expenses and to reduce

the costs to the level of available restrictive budgets. Reasonable ways of using the recourses with adequate proportional allocation of budget appropriations have to fulfill the expectations previously created in strategic documents of Republic of Serbia. A precondition of successful implementation of PPBE system is to create the atmosphere for correct understanding of the processes by all the actors included in PPBES. This is very important for the top management of the MoD and the program managers throughout the Defense system.

As a system, PPBS emerged in U.S.A. an attempt to establish control over the costs of armed forces in order to fulfill the goals, and to answer the question: "How much is

enough?" Until the implementation of the PPBS, all the services in the US Army had created their own budget proposals, which in time gradually, increased. In order to impose the control in such big system, PPBS inventor Robert McNamara requested from the services to create multiyear programs, which were translated into 5 years plans. Later, during the implementation of the programs, it became clear that there were no longer overlaps between the programs.

In time, the system of PPBS has suffered important changes, and today it looks different than in the beginning. On the other hand, today, it is based on a few basic postulates:

- 1) Integral observing of functioning and development of all defense elements;
- 2) On-going process of planning and evaluation;
- 3) It is based on clear criteria's and objective analysis;
- 4) At the same time, it is concerned with military needs and budget expenditures;
- 5) Making major decisions by choosing one of more possible solutions; and
- 6) Usage of multiyear planning in order to correct the results of the previous period and make the correct decisions for the future.

Planning, programming, budgeting and evaluation can be seen as a process. Basic elements of the process are also its phases.

Planning, as a PPBES process is concerned with the strategic environmental estimates, defines national security interests and objectives, and develops the way of their achievement.

The strategic environmental estimate, despite security challenges

and threats, includes economical, technological, political and other trends. National security interests and goals are defined according to strategic environmental threats. The last version of National Security Strategy in Republic of Serbia has been adopted in the October 2009. It has been a base for further development of strategic planning documents.

Programming is seen in the Republic of Serbia, as the base of PPBS process, and it has been developed on the force structure basis. The plans were transferred into a corresponding structure with requested capabilities, considering available recourses. The result of the programming phase is an approved group of major programs which have to include all activities of the defense system over a specific time period.

Unfortunately, while the first steps have been done, budgeting has a higher impact than it should have. Restrictive budget, from year to year, affects creating of financial plan. Therefore, final goals have to be achieved according the budget capacities. The stress of budgeting phase of PPBES should be to convince competent political structure to approve resources which are necessary for executions of the major programs.

Execution is the last phase of PPBES process. Realization of that phase has to secure persistent implementation of the plans, programs and budgets, including necessary corrections during the implementation.

Implementation of the PPBES system has to adapt to the restricted resources. Also, managing the PPBES creates better conditions for efficiency improvement of all elements to accomplish missions and

objectives.

The starting phase of PPBES is the **planning phase**, which identifies long term goals of the defense system and creates long term documents for defense planning. This phase is based on long term studies and analysis, and has to say which necessary capabilities have to be created in order to realize goals defined by strategic (long term) documents.

Long term Development Plan of the defense system of Republic of Serbia is the document of defense planning in which are defined: the strategic orientations for developing the defense system, the necessary capability of Serbian Armed Forces (hereinafter: SAF), the content and dynamics of organizational changes, the development of human and material resources, the financing of the defense system, and other issues for increasing functionality of the defense system, according to its missions and objectives. Long term planning, basically, consists of: introduction; strategic environmental estimates; long term goals and objectives for development; necessary capabilities of the defense system; assumptions for execution of the plan; way of following the process; conclusions and attachments. After concretization of the long term documents, middle term documents are being developed from their concepts.

Middle term documents in Serbian Ministry of Defense are:

- Guidelines for creation of Middle Term Plan and Program for Development of the Defense System;
- Middle Term Plan and Program for Development of the Defense System;
- Middle Term Plan for Functional Plans (midterm plan for human resources, midterm educational

plan, and midterm plan for logistics, IT, etc...).

According to the goals and objectives, established in the long term and middle term documents, short term documents follow some additional documents which are more detailed. Documents for short term planning are:

- Ministerial Guidance;
- Annual plans of functionalities in the defense system; SAF

Once the planning phase has been completed, it has to be translated into major programs.

Next step is **programming**. Programming as the most complex phase of PPBES process has been developed using the experiences of other countries. In order to create adequate PPBE system, the Strategic Planning Department of the Serbian MoD (hereinafter: SPD) in close coordination with the Defense Integrated Planning Directorate of the Romanian MoD. As a result, after the necessary preparation, the Serbian defense system started to use the PPBE system on the 1st January 2009.

Before describing the programming phase, there should be reminded a few theoretical facts referring to programming. Programming is a permanent iterative process in which approved planning documents are translated into major programs, subprograms, and subprogram elements for a specific period using available resources. It consists of a range of activities with the final goal to translate strategic plans into specific details in order to execute them over a particular time frame. It is based on analysis of available financial resources, because of their direct correlation.

Programming is being used to

choose the best solution in order to achieve goals and objectives. The most important output of the programming phase is a group of major programs of the defense system. Major programs are important managerial instruments; in spite of their role in the planning process, they can offer also implementation control, by gathering the data of the program execution managers are able to take corrective measures. Major program data can be used for Parliamentary control over the defense system.

The programming process comprises two basic phases: 1) Development of the major programs and 2) coordination of the major programs. Even if it has only two phases (excluding later reviews and reprogramming), it is a complex process, and its phases involve many participants, who usually have different attitudes and requirements. And by adding the time limitations to what has already been said, we can get the whole picture of its comprehensiveness.

Developing major programs begins with the analysis of strategic documents, previously adopted in the planning phase. Such analysis is being made by the Program Managers together with their own teams of specialists. During the analysis, the stress is on every separate goal of the program, including time tables, priorities and available resources. The result of the analysis is getting an idea about the goals which have to be achieved by the programs and the possibilities and limitations (constrictions) for their achievement.

After analyzing the documents, Program Managers, through the Defense Planning Council of the MoD (hereinafter: DPC), are defining requirements for the development of several alternatives to reach each

goal which has been previously defined. Program Managers guide their teams and present problems that could appear during execution phase and they suggest solutions.

After receiving the requirements from the Program Manager, the program coordinators, with their staffs, prepare alternatives to reach each goal of the major programs. They analyze every possible option from aspects of practicability, the results they offer, the cost in order to support a detailed explanation of their advantages and disadvantages. After analyzing the alternatives presented by the teams of specialists, Program Managers decide about the best options. The choice of the best option has to be based on defined instructions, practicability, capability level, cost and other relevant factors.

Developing major program proposals is an activity made by the program coordinator staff, after previously chosen best option for achieving the goals. A major program is in basically made of:

Names and program managers are determined by the Guidelines for Developing Plan and Program of Developing Defense System. In case of change, it is possible to add a new major program, by special decision of the Minister of Defense.

General and specific goals are defined for each major program. The general goal describes aimed state for the defense system to which the major program contributes, but together with other major programs. The specific goal is the top result of major program implementation. Reaching the specific goals we are getting closer to the general goals.

Expected results are outcomes produced by the major programs. They are developed for all specific goals, and each project or activity

based on the program. When we develop expectations, it is necessary to set the time frame for the expected results.

The structure of the major program is hierarchic and complex. A major program has its own subprograms and subprogram elements, projects and activities. For all the activities, we have to functionality carriers.

Very important elements of the major programs are assumptions and risks. Assumptions are expectations that something is going to happen, and that action will support major program execution. Risks are possibilities that something could become an obstacle in program execution and to prevent reaching the goals.

Performance indicators are parameters witch role is to express the program results in measurable way (quantities, qualities...), in order recognize changes after program executing.

Indicators make possible to follow the degree of realization and how successful are program activities.

Testing means are written materials (reports, studies, norms, etc.), which have objective indicators about the improvements. It is desirable for them not to require additional analysis and researches, due to lack of time and costs.

Time schedule gives dynamics of executing the major programs. Therefore, Program Manager has to be precise when he decides about goals in current year and in each year of the program.

Resource plan has all necessary data about resources (equipment, material, human resources etc.). Resource plan is in relation with time schedule and it is base for plan of revenues end expenses.

Plan of Revenues and Expenses

consist necessary data about financial needs for executing the major programs, projects, and activities according to time schedule (by years). Base for creation of Plan of Revenues and Expenses, are activities and resources expressed in amounts of money. Expenses are divided into three groups: a) personnel expenses; b) operative expenses; c) investments. Revenues and expenses are expressed according to the Budget classifications for every program year and for the whole period. Dividing revenues and expenses yearly is the base for annual budget developing.

The second phase of programming is coordination of the major programs and functional carriers' plans. Responsible for that phase in programming is Strategic Planning Department (hereinafter: SPD) of the MoD. The first activity is major program analysis. As a result of that activity, SPD realizes the correlation between major programs and Guidelines, and gather the data about the degree of possible realization of the goals determined by Guidelines.

After correlating the major programs, SPD determines the issues for Defense Planning Council, which is the highest advisory body for the Minister of Defense in the planning area. DPC analyzes suggestions about major program proposals and gives the final decisions. After that, if necessary, program managers organize a joint review and make the corrections according to the DPC instructions.

After the approval of the major programs by DPC, SPD prepares the Middle Term Plan and Program for Defense System Development. A Mid-term plan is being prepared every year. It consists of a detailed plan for the current year and projection for the next 1 (budget) + 5 (forecast) years.

Inclusive parts of this document are also: detailed review of all the major programs with programs projects and activities, matrix with major programs parameters, financial plans, used methodology, etc.

Building the Middle Term Plans is an on going process through the whole year. On the other hand, creation of the document, its correlation, and adoption by DPC depends on the time limitations and budget calendar. After adoption made by the DPC, the Minister of Defense, approves it. After its approval, the implementation of the document becomes possible.

Relevant and efficient organization and coordination between programs is sometimes impossible during the common ongoing processes in the defense system. Therefore, adequate managing is a precondition for success.

Budgeting phase, the phase which continues the cycle, is the accurate allocation of the funds for each program for the fiscal year and should answer the question what amount of funds and the period in which the funds should be allocated to implement the tasks set.

Budgeting expresses financial needs for personal expenses, operative expenses and investments according to Defense Law, and for executing major programs during one fiscal year.

Budgeting activities at the MoD of Republic of Serbia are based on Budget system law, and Annual Budget law. Budget Proposal is being made for current and +2 forecast years, according to Annual Operational Plan.

Respecting the activities regulated by mentioned laws, the Defense System has its own procedures which are compatible with the time table for

all budget users.

After the adoption of the Budget Memorandum on 1st of June, Minister of finance is issuing Guidelines for creating Budget proposals. On 1st of August all direct users apply their Budget proposals to the Ministry of Finance. At the beginning of October, Government, on Ministerial Proposal approves reviewed Budget Memorandum, considering updated macroeconomic frame. On 15th of October, the Minister of Finance sends to the Government the Budget Proposal. On 1st of November Government receives and approves Budget Proposal and sends it to the Parliament. On 15th of December the Parliament approves The Budget.

According to the Guidelines from the Ministry of Finance for the development of the Budget Proposal and Middle term Plan and Program, the Department for Budget and Finance (hereinafter: DBF) of the MoD, prepares Guidelines for the Financial Plan of the MoD. The DBF sends the Guidelines to the Program Managers and functionality carriers, organizes and coordinates the activities, gives instructions and sends the necessary elements for the development of financial plans proposals (guidelines, conclusions, criteria's, etc).

Functionality carriers at the MoD and SAF give the necessary data to the program managers for developing of Proposal of Financial Major Program. The department for Budget and Finance gathers all the Proposals for all Major Programs, estimates the necessities and capabilities and develops the Proposal of The Annual Financial Plan of the MoD. The DBF's duty is to prepare the Proposal of The Annual Financial Plan of the MoD in time according to the regulations and to send it to DPC. For

the organization, and coordination of all the steps for the development of the Proposal of The Annual Financial Plan of the MoD, the Head of DBF is responsible. Program Managers are obligated to send their own Proposals to DBF within the time limits. For the organization, and coordination of all the steps for the development of the Proposal of the Financial Plan of Major Program, the Program manager is responsible.

The proposal of The Annual Financial Plan of the MoD with explanations and attachments is sent by the DBF to DPC not later than 20th of July in the current year, in order to develop priorities and to develop the Final Proposal of The Annual Financial Plan of the MoD. The final Proposal of The Annual Financial Plan of the MoD, is sent by the DBF to the Minister of Defense for approval no later than 25th of July in the current year.

According to the Budget Law and approved Budget Classification amounts, the DBF develops the Financial Plan of MoD and sends it to the Minister of MoD for approval no later than 30 days from the day that Budget Law enters into force. The financial Plan of the MoD expresses revenues and expenditures of MoD and SAF for the current budget according to the sources of revenues.

The **execution phase** involves implementing the planned activities according to the approved schedule and budget. After developing the Financial Plan of Serbian MoD, DBF prepares Annual Ministerial Settlement for Serbian Ministry and SAF. Once that amounts are approved, the user (hereinafter: credit holder- beneficiary) can start with spending allowed amounts of money in order to achieve its tasks and goals. Accounting jobs and all the payments

in relation to the approved funds to carry out financial plans for users are done by the Accounting Centre of the Ministry of Defense (hereinafter: AC). The monitoring and control of the budget execution are also being made by AC, which is, in fact, the executive body of DBF of MoD. Finally, different kinds of reports are being prepared for all credit holders -beneficiaries and they get feedback from the AC (for all units).

The DBF of the Ministry of Defense is required to plan cash flow liquidity funds of the Ministry, in accordance with the methodology and the deadlines prescribed by the Minister responsible for finance. The obligations taken by authorized persons in the Ministry and the Armed Forces must match the approved appropriation for its purpose for the budget year. Material and beneficiaries of financial operations are being analyzed at least once a month at the level of user funds. According to the time schedule reports can be: monthly, periodical and annual. They can be prepared according to: code numbers for credit holders, budget classification and according to sources of revenues.

As a conclusion, I can say that the main purpose of introducing the PPBE system in the Serbian Ministry of Defense and the SAF is to provide a rational management of resources and to maintain and build capacity of the Ministry and the SAF in order to achieve their goals, objectives and missions.

Expected results of the implementation of the PPBEs are: increasing the efficiency and rationalization of the defense planning to a higher level, ensuring compatibility with defense planning and budgeting system of the state and developing a foundation for the

effective management of defense resources.

The PPBES enables decision makers to see the consequences of their decisions in the future and to assess the organization's progress toward established goals. In the process of PPBES the focus is on the results of the program, on the effort to increase the effectiveness of programming and budgeting process and a great emphasis is placed on budget execution.

The main objective of the process of PPBES is to provide the best force structure, equipment and support within limited resources. The PPBES can be seen also as a system that has its own structure and rules of operation, an on going process which consists of 4 phases: planning, programming, budgeting and execution. It is a basic system for resources management within the MoD. It includes defining the goals

and objectives at the defense system level, the specific objectives for each major program, determining program priorities, ways of their realization, allocating resources, assessing the actual results compared to planned performance and taking corrective action.

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NET PRESENT VALUE SIMULATING WITH A SPREADSHEET

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***Abstract:** Decision making has always been a difficult process, based on various combinations of objectivity (when scientific tools were used) and subjectivity (considering that decisions are finally made by people, with their strengths and weaknesses). The IT revolution has also reached the areas of management and decision making, helping managers make better and more informed decisions by providing them with a variety of tools, from the personal computers to the specialized software. Most simulations are performed in a spreadsheet, because the number of calculations required soon overwhelms human capability.*

***Key words:** decision making, simulation, net present value*

1. NET PRESENT VALUE AND SPREADSHEET SIMULATION

Decision making has always been a difficult process, based on various combinations of objectivity (when scientific tools were used) and subjectivity (considering that decisions are finally made by people, with their strengths and weaknesses). The IT revolution has also reached the areas of management and decision making, helping managers make better and more informed decisions by providing them with a variety of tools, from the personal computers to the specialized software.

Most simulations are performed

in a spreadsheet, because the number of calculations required soon overwhelms human capability. Simulations can be performed with spreadsheets alone (without the help of special add-in software), so that there is no need for expensive software in order to perform this kind of simulations. Such an application is the Oracle Crystal Ball, used for predictive modeling, forecasting, simulation, and optimization, providing insight into the critical factors affecting risk. Using this type of simulations, the right tactical decisions can be made in order to reach the objectives set.

These types of simulations are not confined to the financial area, as they can be used in many domains of

the defense resource management process. In this paper I would like to focus on a possible financial use of the simulations, more precisely in a capital budgeting example, in order to establish some important facts about the output from a spreadsheet simulation.

1.1 OFFSHORE PATROL VESSEL: ADDING A NEW PRODUCT LINE – a case study

This kind of simulation may be used, for example, in the case of a new-product development – a new OPV. Even if the capacity of producing the OPV exists within the country, the decision makers are still faced with the dilemma of choosing between domestic and foreign producers, based on the production (and subsequently the acquisition) cost. The current production capacity of the domestic producer may generate an acceptable production cost, but the decision makers need to have an accurate idea about the financial implications of requesting more products (meaning a possible addition of a new product line).

This information can be easily obtained with the use of simulation in spreadsheets, using startup costs for the proposed new model (which include extensive research and design, building a prototype, and so on). Supposing these costs are estimated at \$150,000 (in thousands), the new OPV would

be sold at a price of \$35,000 (in thousands) per unit. Fixed costs (the costs which are not dependent on the level of activity and have to be covered even if the production is 0) are estimated to run at \$15,000 (in thousands) per year, while variable costs (costs which change in proportion with the level of activity – such as the cost of raw materials) are about 75% of revenues each year.

Tax depreciation (depreciation is first subtracted to determine before-tax profit and then added back to determine net cash flow) on the new equipment would be \$10,000 (in thousands) per year over the expected 4-year product life of the new OPV. The salvage value of the equipment at the end of the 4 years is uncertain, so we conservatively estimate it to be zero. OPV plant cost of capital is 10%, and its tax rate is 34%.

The most uncertain aspect of the proposal is the demand for the new product. In case the demand is known, the *Net Present Value* (NPV) of the proposal can be easily calculated, using a spreadsheet model.

The net present value (NPV) or net present worth (NPW) is a method for evaluating the profitability of an investment or project. The net present value of an investment is the present (discounted) value of investments in the future, also determined as the present value of an investment's

future net cash flows minus the initial investment.[1] If positive, the investment should be made (unless an even better investment exists), otherwise it should not. The present value analysis is a useful concept in decision making with positive results for guiding the inter-temporal choices, because when we study the decision-making process, we have to take into account the role of time in this process. The tie of cash flows is relevant for the decision-maker because in a period of time, the master rate, the inflation can generate gains or especially losses. This analysis regarding the time factor is also available in the case of choices involved in saving and consuming over time.

By recognizing the time value of money and equating dollars from different years, net present value makes it possible to evaluate long-term investments. Accurately estimating the cash inflows and outflows for the net present value calculation is not easy, and selecting an appropriate discount rate for net present value is also difficult. Nevertheless, net present value is a valuable tool for analyzing capital projects and other investments.

NPV is a central tool in discounted cash flow analysis, and is a standard method for using the time value of money to appraise long-term projects. Used for capital budgeting, and widely throughout economics, finance,

and accounting, it measures the excess or shortfall of cash flows, in present value terms, once financing charges are met.

The NPV is calculated using the following formula:

$$\frac{R_t}{(1+i)^t} \quad (1)$$

where

t - the time of the cash flow

i - the discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.)

R_t - the net cash flow (the amount of cash, inflow minus outflow) at time t .

The uses of money also implies in time a certain opportunity cost. A key concept in economics, the opportunity cost is the next-best choice available when having a choice between several mutually exclusive choices. Opportunity cost has been described as expressing "the basic relationship between scarcity and choice." [2], playing a key role in ensuring that scarce resources are used efficiently, at company, ministry or country level. Opportunity costs are not restricted to monetary or financial costs: the real cost of output forgone, lost time or any other benefit that provides utility should also be considered opportunity costs. In this respect, managers prefer only projects with returns, which exceed the cost of

capital (the return available by investing the capital elsewhere).

The interest rate is very important in the present value analysis for determining the returns. The interest rate measures the opportunity cost of funds – the

value of alternative uses of money. So every stream of payments should be compared to the best alternative that has similar characteristics in terms of tax treatment risk and liquidity.

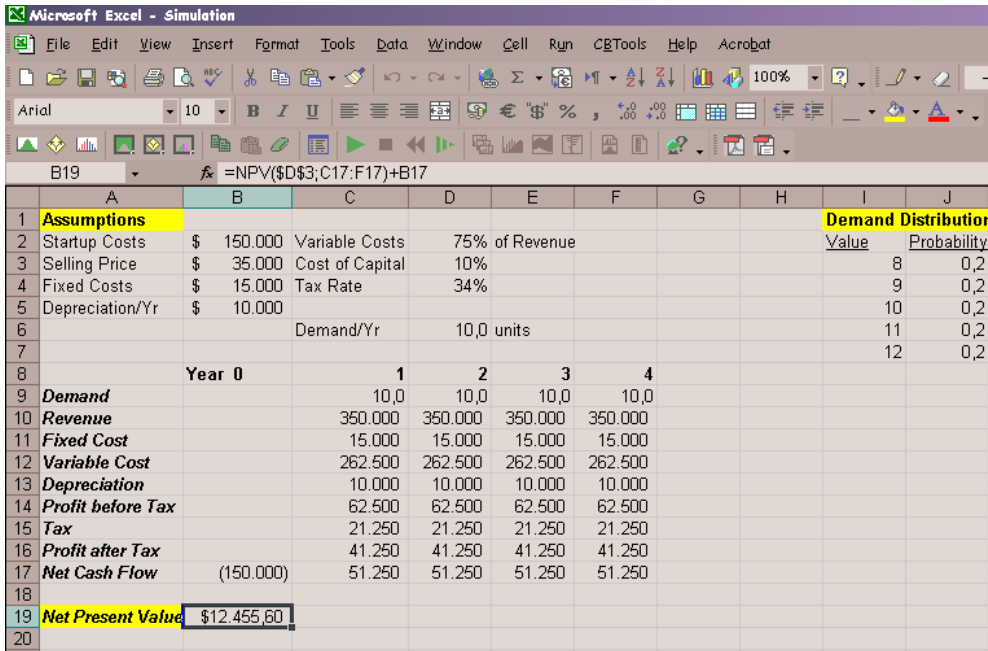


Fig. 1 Net present value calculation

In the case of the OPV production, if we assume that the demand for the new product is 10 units for each the next 4 years, the spreadsheet in Figure 1 shows that the NPV would be \$12,455.60.

However, it is unlikely that the demand will be exactly the same every year. It would be more realistic to model the demand each year not as a common constant value, but as a sequence of random variables. This model of demand is appropriate when there is a constant base level of demand that is subject

to random fluctuations from year to year. When the base level demand is 10 units, actual demand for the next 4 years might turn out to be 12, 9, 8, and 10, because of the random factors affecting demand.

In order to see what effect the variability of the demands has on NPV, it would be useful to generate random demands for the 4 years. We assume initially that demand in a year will be 8, 9, 10, 11, 12 units with each value being equally likely to occur. This is an example of a discrete uniform distribution.

After generating a *random demand* for this probability distribution in Crystal Ball, and repeating this a few times, we find that on some trials we obtain a negative NPV.

The Fig. 3 shows that the NPV corresponding to a random sequence of demands is \$184.57, about 98% less than the NPV if demand were constant at 10 per year. If we repeat the process, we get a different sample of demands, and hence thus possibly a different NPV. Because the demands can vary from sample to sample, the NPV can also vary. Put more technically, the demands are random variables. So the NPV is also a random variable.

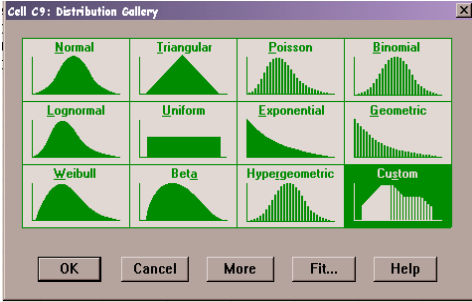


Fig. 2 NPV distribution gallery

Assumptions		Demand Distribution			
	Value	Probability			
Startup Costs	\$ 150,000	Variable Costs	75% of Revenue		
Selling Price	\$ 35,000	Cost of Capital	10%	8	0,2
Fixed Costs	\$ 15,000	Tax Rate	34%	9	0,2
Depreciation/Yr	\$ 10,000			10	0,2
		Demand/Yr	11,0 units	11	0,2
				12	0,2
	Year 0	1	2	3	4
Demand		9,0	12,0	8,0	8,0
Revenue		315,000	420,000	280,000	280,000
Fixed Cost		15,000	15,000	15,000	15,000
Variable Cost		236,250	315,000	210,000	210,000
Depreciation		10,000	10,000	10,000	10,000
Profit before Tax		53,750	80,000	45,000	45,000
Tax		18,275	27,200	15,300	15,300
Profit after Tax		35,475	52,800	29,700	29,700
Net Cash Flow	(150,000)	45,475	62,800	39,700	39,700
Net Present Value		\$184,57			

Fig. 3 Net Present Value Simulation

We need to build a simulation model to answer two questions:

- *What is the mean or expected value of the NPV?*
- *What is the probability that the NPV assumes a negative value?*

The larger the mean NPV – and perhaps even more important – the less likely is that the NPV is negative, the more attractive the proposal to add the new OPV to the OPV product line.

The next step is to run the simulation automatically a number of times and capture the resulting NPV. This can be done much more easily with Crystal Ball than the spreadsheet alone.

The numbers generated will not exactly match those shown in Figure 4, as the procedure shown here generates a random sample of 500 trials from an infinite number of possible outcomes. Hopefully, the overall characteristics of the sample should be similar to the ones shown here. Based on this sample the results indicate that the estimated mean NPV is \$12,040.81 and the standard deviation is a rather large \$12,283.44. This is much closer to the true mean NPV than you would generally get with the limited number of trials you would run with the spreadsheet alone.

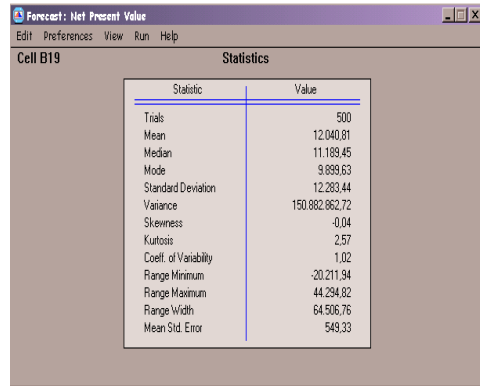


Fig. 4 NPV simulation statistics

We also need to know what are the best possible outcome as well as the worst. We can see in figure 6 that the largest NPV was \$44,294.82 and the smallest was -\$20,211.94, which gives a better idea about the range of possible NPVs that could occur (almost \$65,000).

Although this information offers more insight than just the base case NPV, there other factors that should be taken into consideration. How likely are these extreme outcomes (best case, worst case) to occur? In order to answer this question, we need to know something about the shape of the distribution of the NPV, with the help of some built-in features of Crystal Ball.

One of the interesting features of Crystal Ball is that it has already tabulated a tremendous amount of statistical and graphical information. Some of the information is automatically displayed; other pieces of information must be asked for. As an example of some information we

have to ask for, suppose we want to determine the exact probability that the NPV will be no positive (≤ 0). Crystal Ball can automatically return the percentage number in the corresponding percentile cell labeled “Certainty_____%”. In this case it returns 17.0%, meaning that 17% of the observed NPV values were less than or equal to 0. In like manner we could find out percentage fell below or was above any arbitrary dollar amount.

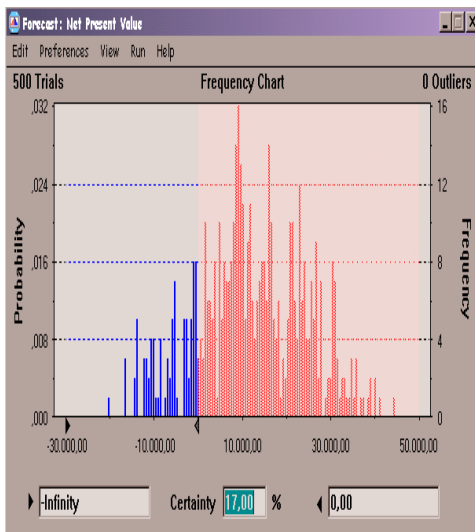


Fig. 5 Frequency chart

Now we have the answers to the questions about NPV distribution:

- What is the mean value of the NPV? (Answer: \$12,040.81)
- What is the probability that the NPV assumes negative value? (Answer: 17.0%)

But other questions arise: How much confidence do we have in the answers we came up with? Would we have more confidence if we ran

more trials?

Certainly, it is intuitive that the more trials we run the more confidence we should have in the answers. But how much confidence can we have in the 500 iterations we have actually sampled? From the world statistics, we remember that we can construct confidence intervals based on the results obtained. For example, we can have 95% confidence that the true mean NPV is contained in an interval of ± 1.96 standard deviation about the estimated mean. In this case, the standard deviation of the mean is the reported standard deviation of the sample divided by the square root of the number of trials.

	A	B	C	F
1	Crystal Ball Results			
2				
3	Mean	\$12,040.81		
4	Std Dev	\$12,283.44		
5	# Iterations	500		
6				
7	95% Confidence Interval			
8	Upper Limit	\$ 13,117.50		
9	Lower Limit	\$ 10,964.12		
10				

Fig. 6 NPV with 95% confidence

This 95% confidence interval for the mean was calculated and is reported in Figure 6 as (\$10,964.12; \$13,117.50). In other words, we can have 95% confidence that the true mean NPV is somewhere between \$10,964.12 and \$13,117.50, with the current best guess that it is \$12,040.81. This interval is tighter than the one we generally develop with a spreadsheet alone where a

smaller number of iterations would generally be used.

3. CONCLUSIONS

We must be careful to avoid falling in the “expected value” trap. Apparently, the true mean NPV can always be calculated by setting all the random values to their means (set all the demands to 10 in this example). This is what we had in our initial spreadsheet, but there is no guarantee that the NPV obtained in this manner will always be true simulated mean. Although it may seem logical, there are some potential weaknesses in this reasoning. First of all, the way in which the random demand values are used to calculate yearly cash flows and then turned into a single NPV number (or any another performance measure) could be highly nonlinear.

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THE DEFENSE PLANNING SYSTEMS AND THEIR IMPLICATIONS

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Abstract: *Defense planning in the Alliance is a fundamental element of the arrangements which enable its member countries to enjoy the crucial political, military and resource advantages of collective defense and other common military efforts to enhance security and stability. In this respect, the aim of this paper is to outline the role of the Armed Forces and the specific processes aiming to achieve the ultimate goal of a nation regarding national security, with focus on defense planning and the PDPS.*

Key words: *NATO, defense planning, PDPS, defense resources management*

1. THE IMPLICATIONS OF NATO AND NATIONAL DEFENSE PLANNING SYSTEMS FOCUSING ON THE ARMAMENT DEVELOPMENTS

National security is the requirement to maintain the survival of the nation through the use of economic, military and political power and the exercise of diplomacy. Measures taken to ensure national security include:

- using diplomacy to rally allies and isolate threats
- marshalling economic power to facilitate or compel cooperation
- **maintaining effective armed forces**
- implementing civil defense and emergency preparedness

measures (including anti-terrorism legislation)

- ensuring the resilience and redundancy of critical infrastructure
- using intelligence services to detect and defeat or avoid threats and espionage, and to protect classified information
- using counterintelligence services or secret police to protect the nation from internal threats

Dealing with defense planning I would like to focus on the role of the Armed Forces and the specific processes aiming to achieve the ultimate goal of a nation regarding national security.

The definition of that phenomenon is the following: *“The armed forces of a country are its government-sponsored defense, fighting forces,*

and organizations. They exist to further the foreign and domestic policies of their governing body, and to defend that body and the nation it represents from external aggressors.”[1]

What to do next, if we have clear goals, objectives, we have the tools, which are the Armed Forces? We should structure the challenges, the goals, the objectives, the tools and the required resources into one process, which is called Defense Planning. We can do that nationally, or participating in a defense organization, it does not matter, the end of the day this very important activity should be done.

1.1. NATO DEFENSE PLANNING PROCEDURE (NDPP)

There exists an organization called NATO which was made up of many different Nations and, in an attempt to find out what resources amongst these Nations so that it could better prepare for all eventualities, it invented a process called ‘Defense Planning.

Defense planning in the Alliance is a fundamental element of the arrangements which enable its member countries to enjoy the crucial political, military and resource advantages of collective defense and other common military efforts to enhance security and stability. It prevents the re-nationalization of defense policies, while at the same time recognizing national sovereignty.

1.2 AIM OF NDPP

To provide a framework within which national and Alliance defense planning activities can be harmonized to meet agreed targets in the most effective way. It should facilitate the timely identification, development and delivery of the necessary range of forces that are interoperable and adequately prepared, equipped, trained and supported as well as the associated military and non-military capabilities to undertake the Alliance’s full spectrum of missions. [2]

The Process Consists of 5 Steps

1. Establish Political Guidance
2. Determine Requirements
3. Apportion Requirements and Set Targets
4. Facilitate Implementation
5. Review Results

Although basic process is cyclical, some elements can occur at different frequencies and Step 4, exceptionally, is a continuous activity.

Previous Defense Planning Process was a cyclical process with **three major stages:**

- The Defense Requirement Review (**DRR**) to determine the required capabilities and subsequent shortfalls,
- The Force Goals (**FG**) process that apportioned goals to Nations (or to NATO organizations and looked for common funded solutions);
- And the feedback element, the Defense Review using Defense Planning Questionnaire (**DPQ**)

This Defense Planning Process dealt with **mid-term** capability requirements (2 to 10 years).

The “old” Defense Planning process had several deficiencies. The most important had to do with inconsistent application of guidance in the different planning disciplines and domains, lack of oversight and control, lack of responsiveness to ongoing operations, lack of sufficient harmonization and coordination between the different planning disciplines.

To resolve these shortcomings, the NATO Defense Planning Process has been developed and was agreed in Apr 2009. The Outline Model of this NDPP consists of five main functions or steps which are generally sequential and cyclical (4 year cycle with bi-annual elements) in nature:

Step 1: Establish a single top level political guidance;

Step 2: Determine on this basis one set of required capabilities as input for all defense planning domains;

Step 3: Apportion the requirements and set targets to nations, individually, multi-nationally or collectively.

Step 4: Facilitate the implementation. This is a continuous activity which seeks to acquire the required capabilities by monitoring and encouraging national implementation, by facilitating and supporting multinational implementation and by executing collective implementation.

Step 5: Review the results. This seeks to examine the degree to which

the requirements have been met, to assess the ability of NATO to meet its ambitions, and to offer feed-back and direction for the next cycle of the Defense Planning Process.

The NDPP focuses on mid and longer term capability development, and remains responsive to urgent requirements from current operations.

Generally speaking, the aim of defense planning is to provide a framework within which national and NATO defense-related planning can be harmonized so as to meet the Alliance’s agreed requirements in the most effective way. In other words, defense planning seeks to ensure that the Alliance has the requisite forces, assets, facilities and capabilities to fulfill its tasks throughout the full spectrum of its missions in accordance with the Strategic Concept. As such, it covers both NATO’s own capabilities and those of Allied countries.

In specific terms, defense planning encompasses seven different planning disciplines. There are three primary disciplines: **force**, **resource** and **armaments planning**; and four supporting disciplines: logistics, nuclear, C3 (consultation, command and control), and civil emergency planning.

Defense planning is also related to other disciplines, such as air defense planning, standardization, intelligence, operational planning, and force generation. Most of these disciplines are conducted with the participation of all Allies, under the aegis of the North Atlantic Council and the Defense Planning Committee.

1.3. THE DEFENSE PLANNING DISCIPLINES

- Force planning

Force planning deals specifically with providing NATO with the forces and capabilities from members it needs to execute its full range of missions, in accordance with the Alliance's Strategic Concept. In essence, it seeks to ensure that Allies develop modern, deployable, sustainable and interoperable forces, which can operate abroad with limited or no support from the country of destination.

The force planning process is based on three sequential main elements, namely **political guidance**, **planning targets** and **defense reviews**. Political guidance sets out the overall aims to be met, including NATO's Level of Ambition that establishes in military terms the number, scale and nature of operations that the Alliance should be able to conduct. Planning targets include both a detailed determination of Alliance requirements and the setting of implementation targets to fulfill those requirements. Defense reviews provide a means to assess the degree to which the planning targets are being met.

- Resource planning

The large majority of resources are national. NATO resource planning aims to provide the Alliance with the capabilities it needs, but focuses on the elements that are joined in common funding, that is to say where members pool resources within a

NATO framework. In this regard, resource planning is closely linked to operational planning, which aims to ensure that the Alliance can fulfill its present and future operational commitments and fight new threats such as terrorism and weapons of mass destruction.

There is a distinction to be made between joint funding and common funding:

Joint funding covers activities, managed by NATO agencies, such as the NATO Airborne Warning and Control System and NATO pipelines;

Common funding involves three different budgets: the **civil budget**, which covers the running costs of NATO headquarters; the **military budget**, which essentially covers the running costs of NATO's integrated military command structure and the NATO-wide communication and air defense networks; and the NATO Security Investment Program (**NSIP**) that covers core NATO-wide investment requirements for communication systems, air defense systems and core networks of airfields, fuel supplies and command structures. The military budget and the Security Investment Program also support the theatre headquarter elements of crisis response operations.

Relatively speaking, these budgets represent a small amount of money, but they are key for the cohesion of the Alliance and the integration of capabilities. NATO's military common-funded budget represents 0.3 per cent of the combined defense budgets of Allied members.

- Armaments planning

Armaments' planning is one of the main constituting elements of NATO's defense planning process. It aims to support the Alliance's military and political objectives, as well as its capabilities, and focuses on the development of multinational (but not common-funded) programmes. It does this by promoting cost-effective acquisition, co-operative development and the production of armaments. It also encourages interoperability, and technological and industrial co-operation among Allies and Partners.

- Logistics planning

In NATO - as is the case at a national level - logistics planning is an integral part of defense and operational planning. It aims to identify the different logistics capabilities that need to be acquired by members and NATO to support the NATO and national Level of Ambition.

- Nuclear planning

To preserve peace and prevent coercion and any kind of war, the Alliance will maintain for the foreseeable future an appropriate mix of conventional and nuclear forces based in Europe. Both elements are essential and cannot substitute one for the other.

- C3 planning

The effective performance of NATO's political and military functions requires the widespread utilization of both NATO and national Consultation, Command and Control (C3) systems, services and facilities,

supported by appropriate personnel and NATO-agreed doctrine, organizations and procedures.

- Civil emergency planning

NATO civil emergency planning is a small scale, but relatively wide-ranging activity that touches on different aspects of civilian and military planning and operations. Its main roles consist of civil support for military and crisis response operations, support for national authorities in civil emergencies and the protection of civilian populations. It also focuses on improving civil preparedness for possible attacks with chemical, biological, or radiological agents. In sum, civil emergency planning aims to coordinate national planning activity to ensure the most effective use of civil resources in collective support of Alliance strategic objectives.

- Related disciplines

There are a number of other related disciplines, which are closely linked to the defense planning process. These include air defense planning, standardization, intelligence, operational planning, and force generation.

2. THE HUNGARIAN PORTFOLIO DEFENSE PLANNING SYSTEM (PDPS)

The Portfolio Defense Planning System was launched for trial in 2004, and introduced in 2005. Since then the System has been developing with success but it is not finalised yet. It is still undergoing

significant transformation as well as the collective defense planning procedure.

The National Security Strategy and the National Military strategies provide the solid basis for the development of Military Strategic Concepts. This is a very good approach since from the global situation, through the specific goals and objectives we can go to the specific tasks and missions necessary to plan in response to the challenges.

2.1 THE MAIN GOALS OF INTRODUCING THE SYSTEM WAS:

- To harmonize the planning process from Strategy to Budget;
 - To integrate the capability (military) and economic planning;
 - To enhance the effective allocation of resources;
 - Identification of the necessary long-term requirements to the HDF and NATO.
 - Restructuring of the armed forces in such a way, that it will provide a more cost effective sustainability and to support the development of the planned capabilities for the HDF.
 - Focusing on the programs, which improve the life- and working conditions.
 - Focusing on the establishment of an advanced, expeditionary force by developing the new capabilities. Pushes capability improvements in order to meet the requirements.
- Also taking attention for the niche capabilities in order to reduce the shortfalls of Alliance.
 - One of our most important goals is to contribute to peace-support operations more effectively by concentrating forces according to our interests and meeting greater professional challenges.
 - Enhances interoperability mainly for the contributed forces in order to meet the due requirement of NATO.

Objective of the PDPS is to develop and maintain a deployable and sustainable defense force in accordance with basic security and defense policy documents.

Mission of the PDPS is the long- mid- and short-term planning of the development, operation and maintenance of required military (defense) capabilities.

2.2 THE STRUCTURE OF PDPS

The PDPS has **four** pillars; the Strategic Guidance Subsystem, the Capability- and Mission Planning Subsystem; the Resource- and Cost Planning Subsystem; and the Budgetary Planning Subsystem.

The **Strategic Guidance Subsystem** provides political guidance as a basic input for the definition of required military capabilities, summarizes requirements for the forces, and prioritizes capability-requirements based on the Government's objectives. This subsystem produces Hungary's level of ambition for participation in military missions and issues the Ministerial

Guidance for Defense Planning.

The **Capability- and Mission Planning Sub-system** is responsible for the short-, mid- and long-term force planning; the development of capabilities required by missions and tasks. This sub-system identifies force structure and operational requirements, and elaborates mission- and capability indicators required for resource planning. In cooperation with the Strategic Guidance Sub-system, this sub-system elaborates options for force development and armament and equipment programs required for capability improvements.

The **Resource and Cost Planning Sub-system** is designed for costing of options elaborated by the Capability- and Mission Planning Sub-system, and for allocation resources to the whole spectrum of activities of the defense portfolio. During this process, the sub-system, in cooperation with Strategic Guidance and the Capability- and Mission Planning Sub-systems, strikes a balance between the available and required resources.

The **Budget Planning Sub-system** is designed for deriving the yearly budgets based on the approved short- and long-term force plans; to form the mission oriented budgetary needs to budgetary estimations, to prepare the budgetary presentation for the Parliament, to pursue backward planning based on the budget appropriations of the portfolio and documentation of the execution of the approved budget. A further task of the Sub-system is the

supervision of elementary budgets, and planning of budgetary provisions of tasks under the authority of the Sub-system.

2.3. MANAGEMENT OF THE PORTFOLIO DEFENSE PLANNING SYSTEM

Operation of the Strategic Guidance Sub-system is supervised by the State Secretary for Defense Policy, and is the responsibility of the MoD Department for Defense Policy.

The work of the Capability- and Mission Planning Sub-system is supervised by the Chief of Defense Staff and is the responsibility of the MoD Force Planning Department.

Operating the Resource and Cost Planning Sub-system is controlled by the State Secretary for Defense Planning & Infrastructure and is the responsibility of the MoD Defense Planning Department.

The Budget Planning Sub-system is controlled by the State Secretary for Defense Planning & Infrastructure and is the responsibility of the MoD's Economic and Financial Agency.

The defense planning process contains the national and alliance expectations, goals and objectives for the defense and for the necessary forces. It is really general in term of long term period, but very specific regarding the guidance for the planning period, which is currently a 10 year period.

- **Determination of capability needs:**

The determination of the

military capability needs will be the bases for the establishment of the capability development directions and objectives. It takes into account the current state of the Armed Forces and the ongoing development processes. The output of this phase is the Proposal for the capability development for the Armed Forces. Ideally this proposal should contain the suggestions for the plans of the capability/organization development, its main tasks, priorities, timing and proposals for programs and the necessary resources.

- **Determinations of the 10 year goals and the necessary resources:**

The development of the plan is executing in two phases. During the first phase the design of the plan is developed with different kind of options. The decision makers (Ministry of Defense) can chose one option and the detailed plan will be developed according to that intention.

- **Planning of the implementation:**

The approved 10 year strategic plan is the bases of the development of the short term detailed planning activities. Taking into account the annual approved budget and the prognoses for the next year, very detailed short term plans are developed (annual and 1+n year plans).

- **Analyses, evaluation:**

During the planning and the implementation phases it is really necessary to evaluate the situation, the analyses of the percentage of the implementation and reviewing the

harmony between the objectives and the execution. This feedback can be an input for the next year's plans or if it is necessary it can be the cause of an adjustment.

The defense planning is a very broad area and also it is a very responsible and vital activity in terms of providing national and international security. Based on the goals and objectives envisaged in the NSS and the NMS, experts should think and work a lot to achieve those objectives.

The financial resources available are very important because without the necessary support the plans remain plans and the implementations change into dreams.

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ORGANIZATIONAL CHANGE: A MATTER OF INDIVIDUAL AND GROUP BEHAVIOR TRANSFORMATION

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***Abstract:** Contemporary life is raising a plethora of challenges for all organizations. Therefore, flexibility and continuous change ought to be their priorities. The main problem is how to actually implement change and make it work. The answer suggested by this article is that by transforming people's behavior and attitudes one can actually lead to organizational change. However, some insight into the prerequisites needed to transform individual and work group attitudes and behavior is required. As a result, in order to identify and list a set of principles that should play the role of the 10 Commandments in any organizational change process the aim of this article is to take a theoretical approach to this issue.*

***Keywords:** organizational change, behavior transformation, attitude, group dynamics*

1. INTRODUCTION

Organizational change is a salient feature of organizational development [1]. In this respect, the research in the field [2] defines it as a proactive search and identification of development opportunities. Hence, organizational change involves identifying and/or formulating flexible answers to the economic, social, technological and political dynamics of an organization's external environment [3].

Regardless of its target (*i.e.* changing an organization's legal status, organizational services/product diversification, redefining individual and team tasks and activities, adapting

to new technology, restructuring and remodeling organizational processes, reinventing organizational image [4] or its type of response to external challenges (*i.e.* reactive or proactive) the most important resource needed in the transformation process is the human one [5]. As a result, its values, attitudes and behaviors are of utmost importance. Their proper understanding and management with tangible results in terms of employee involvement and commitment to organizational objectives are the keystone in supporting and accomplishing the change desideratum. On the other hand, poor management or disregard for the aforementioned aspects both

at group and individual level can lead to apathy, passive, active or, at worst, aggressive resistance [6].

Based on the above observations, the aims of this article are threefold. First, a theoretical model describing the link between organizational change and individual and group behavior transformation will be briefly overviewed. Moreover, a set of principles grounded in behavioral psychology, underlying any description of human behavior in terms of values and attitudes and enabling the view on organizational change as an unfolding process will be presented. These theoretical assumptions will contribute to the identification of a number of factors that need to be taken into account when approaching attitude (and, inherently, behavior) transformation as a necessity for organizational change. All this will result in a number of laws that should govern any organizational change attempts.

2. KURT LEWIN: A THEORETICAL MODEL OF ORGANIZATIONAL CHANGE

One of the theoretical models of great impact upon research and practice in the field of organizational change was developed by Kurt Lewin [7]. The propositions underlying it can be formulated as follows [8]:

- Individual behavior is a merger between personality traits and environmental features. Therefore, the best means to change behavior is to change the environment.
- Facilitating behavioral change at individual level and, as a result,

at organizational level, involves creating an imbalance in the field of forces that lead to a behavioral *status quo*.

Concerning the first hypothesis, Lewin emphasizes that understanding and predicting individual behavior requires grasping the interdependence between an individual and his conditioning environment. The latter has an important say in consolidating social habits and group norms and rules that underlie individual and organizational behavior. Therefore, long lasting behavioral changes and transformations consist in deconstructing the equilibrium of these habits and norms. Moreover, the more valued the latter are, the greater the change effort required. Hence, the ensuing dilemma: what actions are required to produce behavioral change not only at an individual level but also in the environment to which belongs the individual.

Lewin's solution is to first change group norms by creating a state of disequilibrium (the **unfreezing** stage, as called by the theorist) in these forces, namely a feeling of dissatisfaction and discomfort. The ultimate aim of such an action is to undermine the self-satisfaction feeling induced by group norms acceptance. In practice, such action is possible by confronting the individual with a set of information that comes in contradiction with his expectations. However, the information must be linked to what the same individual values most [9].

Second, a transition stage (**moving**) is needed. The latter involves identifying unproductive behavioral patterns, defining the

desirable ones. In this respect, changes in organizational processes and structures are required. Some of the most important include the following: redefining roles, responsibilities and organizational relationships, developing skills and competencies, encouraging change promoters and removing change resistance agents [10].

As a result of the two previous stages a new organizational equilibrium (**refreezing**) is needed. The solution towards creating it consists of consolidating organizational culture and structure, as well as the reward system.

The conclusions that can be drawn from this theoretical input can be formulated as follows:

- Individual behavior change is possible by acting upon the group norms enforcing it.
- Behavioral change rests upon identifying and acting upon the values upholding the attitudes of affiliation to group norms.

As a result, organizational change must be first and foremost grounded in understanding individual and group values, attitudes and behaviors. Therefore, to accomplish it one needs a better theoretical understanding of these concepts and of their interrelationships.

3. INDIVIDUAL BEHAVIOR: SOME THEORETICAL PROPOSITIONS

Social systems and social behavior (and in the case of organizations individual and group behavior) can be defined and explained in terms of values, norms, communities

and ensuing individual roles. From this point of view, Homans [11] formulates a number of theoretical propositions derived from behavioral psychology:

- **Behavior is the result of the benefits it yields.**

Thus, individual behavior is described by a set of actions undertaken in a given environment. Their consequences may be positive ones (such as rewards, incentives, positive reinforcers) or negative ones (such as sanctions, punishments or other negative reinforcers). Therefore, behavioral alternatives are modeled in accordance with the results of initially made decisions.

- **Social behavior is an exchange process.**

From this point of view, the exchange process can be defined as the social interaction between behavioral systems. Such an interaction, also known by the name of “*action and reaction*” [12], is grounded in the benefits gained by an individual from another individual’s behavior and it takes the form of sociability, cooperation, competition, etc.

The theoretical principles accounting for individual and group behavioral variations are formulated as follows [13]:

- **The success principle:** the more frequent an action’s reinforcement, the greater the likelihood of that action to be repeated.
- **The principle of stimuli similarity** upholding that similar situations yield general reinforcing effects. Thus, if a certain stimulus was used as an action reinforcer in the past, the

more future stimuli resemble that specific stimulus, the greater the likelihood for an individual to perform identical or similar actions to the one previously reinforced.

➤ **The value principle:** the more valued an action's result, the greater the likelihood of reiterating that very action.

➤ **The deprivation/sufficiency principle:** the more frequently used a reinforcer, the less valuable the latter becomes to an individual.

➤ **The aggressiveness/approval principle:**

- when the reward or sanction received for a specific action contradict the individual's expectations, the latter will react emotionally. Hence, the likelihood of an aggressive behavior increases and, in the end, its results may be positively valued by that person. (the aggressiveness principle).

- when the reward for a specific action meets or even exceeds the individual's expectations or when an action is not sanctioned as expected, the likelihood of valuing the results of the ensuing behavior and, hence, of repeating it increases. (the approval principle).

Referring to the latter principle, Homans introduces the distinction between reflex and voluntary behavior. Thus, if in the initial stages an emotional outburst can only be a matter of reflex behavior, the positive reinforcement of its results may lead to future voluntary behavior.

The above principles are based on the hypothesis of a personal history of positive and negative

reinforcers and, inherently, on a complex set of expectations derived from them. As a consequence, these principles are important to remember when attempting to induce organizational change since they underlie a "spontaneous order" [14] within social systems and are strongly connected to reinforcement strategies.

Two concepts complementary to these principles are necessary to be understood before taking any change effort. These are: *expectancy* and *value*.

As far as expectancy is concerned, the latter is the result of previous experience and influences future behaviors. It cannot be held under scrutiny like behavior but it establishes the values underlying behavioral variables and thus plays an important role in influencing behavior. As a result, alongside with its positive or negative assessments, it is an inherent component of attitudes.

Value, from the perspective of the above principles, is defined as the frequency of the choices made by an individual to perform or not a series of actions based on the benefits or costs they incur at a personal level. These costs and benefits are nothing but means and desirable goals [15], even if in an idealistic definition they are equaled to universal values such as equality, freedom, etc. [16] or individual ones like self-development, recognition, love, security, etc.[17]. Thus, even though generally speaking values are described as more abstract and all-inclusive compared to the attitudes they uphold, this article will be referring to values in terms of the

costs and benefits an individual attaches to his actions.

An important argument in favor of such an approach is brought by Muzafer Sherif and Carolyn Sherif [18]. According to them, the assessment of an individual, object, situation (in other words, the attitude) does not depend on the quality of the arguments presenting the advantages and disadvantages, but on its alignment with an already existing attitude and on the results it may have upon future individual actions (in other words, on the costs and benefits).

4. ATTITUDE CHANGE: A PREREQUISITE FOR BEHAVIORAL CHANGE

A definition of attitudes highly relevant for the purposes of this article suggests the following [19]:

“When we talk about attitudes we actually talk about what a person has learnt as a result of his integration into a family, group, or society and, hence, about what enables him to reject transitory reactions in favor of a constant and characteristic manner of acting. As a result, such a person can no longer be neutral in assessing the surrounding environment and therefore it includes it in the dichotomic categories of pleasant- unpleasant, favorable-unfavorable, agreement disagreement”.

The more frequent an object (e.g. a person, place or problem) is assessed, the more likely a certain attitude to emerge (the concept of attitude accessibility) [20]. Thus, an attitude of high intensity (i.e. highly in favor or against) is the result of an

automatic association (an association which in its turn is the result of a continuous process of learning and updating) between the features of an object and its assessment in terms of the strong emotions it yields. On the other hand, a low intensity attitude results from the association between an object and its medium to neutral emotional assessment. In this respect, it is important to emphasize that an individual may be familiar with an object's features without automatically associating them with their positive or negative evaluation.

The conclusions emerging from the experiments done in order to appropriately describe the concept of accessibility and, inherently, the relationship between behavior and attitude [21] are as follows:

- The more frequent the mental association between an object and its emotional assessment, the more complex their interrelationship.

From this point of view, the object of love or of hatred is associated with negative or positive feelings, as the case may be. Thus, the more automatic the association is, the more intense and the more influential the attitude at a subconscious level for individual behavior becomes.

- Humans are more likely to pay more attention to the objects associated with accessible attitudes.

In other words, the more intense the feeling towards certain objects, the more likely for those objects to draw our attention.

- Accessible attitudes act as filters for information processing.

The likelihood of processing information in a biased manner is

heavily influenced by the automatic activation of attitudes when encountering real life situations. The more associated the latter with powerful feelings (whether negative or positive), the more likely for them to act as triggers for attitudes.

As for the factors that contribute to attitude change and, inherently, to behavior transformation they are divided into four categories [22] (the **message- learning approach**): the source, the message, the receiver, the target.

Concerning the source of the message aimed at changing attitudes and behaviors, its influence depends on:

- **Credibility:** a highly credible source is more likely to influence a receiver. From this point of view, the assessment criteria for a source's credibility are competence and honesty.
- **Source's attractivity** for the receiver. The latter can be best assessed by the following criteria: familiarity, similarity with the target and liking. Thus, a liking, physically attractive or similar source is much more convincing than its less attractive alternatives.
- **Power.** From this point of view, a source perceived as able to reward or to punish can influence a lot publicly or privately held opinions.

As for the message target [23] there are two important factors used by any receiver to process messages, namely: motivation (defined as the degree of commitment and the need to learn) and competence. The more interesting and relevant a problem is, the more motivated a receiver is

to listen to a source's message and, eventually, to change his attitude and behavior. Moreover, the greater the need to understand certain issues is, the more open the receiver is to message processing. In this respect, competence plays a major role in maintaining or changing attitudes: the more knowledgeable someone is, the more difficult it becomes to convince that person.

The impact of a message aimed at transforming an attitude/behavior depends on the quality of arguments and on the conversational style (i.e. fluency, rhetorical devices, etc.) chosen to present them.

5. ORGANIZATIONAL CHANGE - A MATTER OF INDIVIDUAL AND GROUP BEHAVIOR TRANSFORMATION. SOME PREREQUISITES

Based on the theoretical input overviewed in the previous subchapters some fundamental prerequisites for organizational change can be formulated. They are as follows:

- Change involves undermining the self- sufficiency feeling by helping individuals and groups unlearn some attitudinal habits;
- Change is a matter of interrelationships and that, in its turn, is facilitated by organizational infrastructure;
- Change is synonymous to learning by continuously questioning individual and group habits and norms;
- Change is a process of discovery, of testing and validating alternatives (first, the ones

pertaining to individual and group attitudes and behaviors and second, the ones related to an organizations' mission and objectives);

- Change is the result of taking responsibility for the consequences of one's behavior on the other individuals;
- Change is a matter of honesty to oneself and to the others;
- Change is a matter of competence;
- An individual's motivation to change depends on the costs/benefits ratio.

All of the above prerequisites are based on interaction. The latter is actually the keystone to organizational development and change [24].

Therefore, in order to understand how organizational change can take place by transforming individual and group behavior one first needs to understand the organizational scripts that generate this behavior and its underlying attitudes. Hence, the goal of organizational change ought to be the rewriting, the renegotiation of those scripts and of the contracts they generate for each and every individual. Thus, by meeting the prerequisites above a coherent contribution of an organization's employees to the latter's attempts at changing itself becomes possible.

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CONSIDERATIONS REGARDING KNOWLEDGE MANAGEMENT

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Abstract: *Knowledge management is the process by which the organizations generate wealth from their intellectual assets putting both tacit and explicit knowledge into action. Nowadays having access to data and information is something ordinary and easy to be done thanks to the advancements in IT and communications; still this is not enough when it comes to solving a problem: having the tools does not imply that one has the knowledge of how to use them.*

Keywords: *data, information, knowledge, knowledge management, tacit and explicit knowledge*

1. SOCIETY AND KNOWLEDGE MANAGEMENT

Nowadays, we have at our disposal a huge quantity of information on every subject we are interested in but, this is not enough. For example, having a computer connected to the internet is not enough if you want to use the information existing there, you also need to know how to use the computer, how to connect to the internet etc.; and for all these you need knowledge. Since our society relies so much on knowledge a new type of management appeared: knowledge management. There's no universal definition of knowledge management, just as there's no agreement as to

what constitutes knowledge in the first place, this is why the best way is to look at knowledge management in the broadest context. Succinctly put, knowledge management is the process through which organizations generate value from their intellectual and knowledge-based assets. Most often, generating value from such assets involves sharing them among employees, departments and even with other companies in order to spread best practices. It's important to note that the definition says nothing about technology; while knowledge management is often facilitated by IT, technology by itself is not knowledge management.

Knowledge management efforts typically aim to reach organizational

objectives such as improved performance, competitive advantage, innovation, the sharing of lessons learned, integration and continuous improvement of the organization. Knowledge management efforts overlap with organizational learning, and may be distinguished from that by a greater focus on the management of knowledge as a strategic asset and a focus on encouraging the sharing of knowledge. Knowledge management efforts can help individuals and groups to share valuable organizational insights, to reduce redundant work, to reduce training time for new employees, and to adapt to changing environments and markets. [1]

What is characteristic for the knowledge society is not the great amount of information within easy reach for everybody but, the knowledge everyone has to have in order to manage the data and information. Information is something exterior which is at our disposal and we can make use of it but, knowledge is interior, something we develop, it relates to our operational capacity. Information is valuable only if we know what to do with it and for this we need knowledge; knowledge is what makes information valuable, we need to know where to look for it, what to choose and how to use it. When we talk about knowledge management it is very important not to mistake some terms: *data*, *information* and *knowledge*. Collins Concise Dictionary says that *data* refers to “a series of observations, measurements and facts” [2], *information* refers to

the act of informing, the condition of being informed and *knowledge* signifies the facts or experiences known by a person or a group of people; the act of knowing or understanding gained through experience or learning. Analyzing these definitions we could say that information refers to data organized in a certain way, placed in a certain context and which acquires a certain meaning. Knowledge is information having a supplementary encoding. When referring to knowledge management Nonaka and Takeuchi were talking about a spiral going up from the individual level to the group level, then to the organizational and interorganizational level; so now, we have the data which is taken out of the context and has no meaning by itself; data becomes information when we understand its meaning and we can integrate it in a context. Information is data put at work, information becomes knowledge when the person who uses it understands the models existing in the information, how they work and will be able to use them in the future. Even if information means seeing and understanding the relations between data, it does not say anything about the changes data might undergo, the significance of the information being given by the context. Information refers more to a description, a definition: *who*, *what*, *when* and *where* and knowledge includes strategies, practice, methods: *how*. The Japanese point of view upon knowledge management says that knowledge is not only a

set of data or information, it also comprises emotions, values, hunches; a company does not only manage the knowledge but should also create some. Each employee of the organization is involved in creating the organizational consciousness and middle managers are those who analyze and interpret knowledge to add meaning to it and to create knowledge. [3].

There are two types of knowledge: implicit/ tacit and explicit. Tacit knowledge is the knowledge we each carry in our heads about how to do things, who to call and the lessons learned through experience. It is that knowledge which is understood implied; it is informal, experimental and difficult to be communicated, it is the knowledge existing within the minds of the individuals. Explicit knowledge is that which is stated in detail and doesn't leave anything implied, it is the knowledge that can be recorded, encoded and transmitted; it can be organized or stored, it is definite and most of the time objective. Explicit knowledge creates rules and sets limits, e.g. and technical specifications or capabilities of equipment (field) manuals, unit standing operating procedures, operation orders etc.

Nonaka and Takeuki say that organizational knowledge is created when knowledge is converted from tacit to explicit and through the interaction of these two types of knowledge innovation takes place.

Starting from the premise that knowledge is personal and most

of it will remain tacit, the tacit knowledge approach typically states that the dissemination of knowledge in an organization can best be accomplished by the transfer of people as “knowledge carriers” from one part of an organization to another.

Learning in an organization occurs when individuals come together, share their ideas and develop new insights together that will lead to the creation of new knowledge.

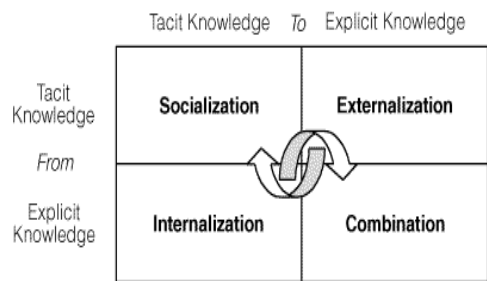


Fig. 1 Knowledge creation cycle

As we can see in the figure above knowledge creation occurs in a dynamic and continuous cycle. First of all it begins with socialization, phase in which the individuals share experience and mental models. Then it continues with the externalization stage in which people use metaphors and images to turn tacit knowledge, which otherwise would be difficult to communicate, into words. Next, it goes into the combination phase where knowledge will be articulated, shared and presented. The last phase is internalization; this is how individuals learn and put into practice the new knowledge.

A modern organization should be prone to learning and training, its employees should be taught

how to learn and develop new ideas. Generating new ideas is not an exclusively formal process, knowledge generation and transfer can take place during a brainstorming session but also during a coffee break or an informal session. Managers should be aware that the individuals are those who possess knowledge, who can create it or use it.

Knowledge management differs from information/data management in the way managers/leaders make their personnel apply, use, communicate and develop already existing knowledge. Knowledge is useless unless it helps the development of the company. There are many organizations which have large data bases and information stocks which were used only for the present activity and never as generators of new ideas. Putting knowledge into practice requires that it should be communicated from person to person thing which cannot be done easily; this is why managers should be the facilitators of knowledge transfers and they should stimulate those who generate and disseminate new ideas.

2. KNOWLEDGE MANAGEMENT FOR THE MILITARY

The changes that have taken place in the 21st century environment required transformation in the doctrine and organization. In the new warfare it is very important to have a knowledge advantage over the adversaries. Good knowledge

management is essential for the military. “Knowledge superiority in military operations requires dominant battlespace awareness and visualization. As the battlefield changes and the tempo of war increases, the pace of information creation and decision-making also multiplies” [4].

For every warfare information is essential but, for the modern warfare, which relies on information from many sources, it is very important that it be assessed quickly and compiled for immediate use. The military live in an environment where timelines are shorter, an environment which requires situational awareness tools superior to those of the opponents in order to anticipate their reaction, an environment for which knowledge, and here we can speak about both tacit and explicit knowledge, is of the greatest importance. Explicit knowledge that contained in field manuals, unit standing operating procedures, operation orders, etc. is used during operations in order to support understanding and decision-making. Tacit knowledge is also important to solve a problem or explore an opportunity. Intuition is an example of tacit knowledge. So is being able to understand the critical factors on which to focus in a complex situation. During a mission leaders need to create and get the knowledge needed to accomplish it. And at the same time they need to involve each military’s tacit knowledge to increase their awareness and understanding of the situation. Knowledge, both

tacit and explicit, helps leaders make better decisions and conduct more effective operations

Globalization is present even in the warfare context. Warfare and all the other component elements of peacemaking and peacekeeping take place on a global scale, they have exceeded the area of local or regional conflicts. This is why, situational awareness and decision-making rely more than ever on sources beyond the immediate theater of operations; even more, the information should come instantaneous from every corner of the world. For this reason, the military, like their corporate counterparts, understand and recognize the importance of the intellectual capital and knowledge management.

Unfortunately all the social and demographic changes that affected the work force also affected the military. The military personnel perform two major functions: First, they carry out functions for commanders that commanders could not perform alone or that require specialists, such as engineers, artillery, and logistics.

Second, military personnel develop and manage information. The information is gathered, organized and analyzed to create knowledge which later will be applied in planning and decision-making. The personnel take care of the information transfer to the commander, other staff members, and higher, subordinate organizations. At the same time commanders guide and help with the understanding and decision-making of the personnel and

share their knowledge through formal or informal meetings. Knowledge management can be used for several purposes:

- Facilitating;
- Situational understanding;
- Decision-making;
- Transfer of expertise and experience;
- Enhancing organizational learning during operations;
- Enhancing collaboration among personnel at different places;
- Incorporating simulations and experiential learning into training;
- Influencing doctrine development.

Integrating knowledge management in the organization improves sharing of observations and lessons before, during, and after a mission.

Knowledge management integrates the lessons needed for organizational improvement and later these lessons, observations and insights will be included into modified tactics, techniques or procedures and will be disseminated them within the unit(s). These lessons will be stored in official lessons learned databases for others' use. Knowledge management tools help leaders research doctrine more effectively for tactics, techniques, and procedures to help solve tactical problems. KM also connects operational units with subject matter experts and peers with relevant experience to obtain their assistance, both before and during an operation.

To conclude I can say that

knowledge management principles can be brought to situational awareness, sense making and decision-making in the military context. As a strategic approach to achieving defense objectives, military knowledge management will play a valuable role in leveraging existing knowledge and converting new knowledge into action.

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ROMANIAN DEFENSE RESOURCES MANAGEMENT UNDER CRISIS CONDITIONS

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***Abstract:** Defense resources management is a harder field to deal with in economic and social crisis conditions. It is not under war but peace conditions and one has to understand it as if it were under war conditions. The paper introduces the reader to the possible type of approach and factors to be considered when developing strategies and implementing directives in time of peace with a consideration of resources as if it war in time of war. Risk analysis is of outmost importance in dealing with resource allocation in time of crisis, and directions to it are proposed here. Also, a different view of the chain of command in the hierarchy and its role in crisis time, responsibilities and attributes one should fulfill in the decision-making process for the reason of efficiency and effectiveness in the military field. Finally, a round-up conclusion brings us to the question if anything can be done without the political factor involved and which type of involvement it should be.*

***Keywords:** defense resources management, risk analysis, decision making process*

Improving performance of Romanian DRM facing crisis conditions could be achieved by means of promoting and implementing a range of managerial modernization methods. Among them one can mention several factors pertaining to strategic management: redesigning the managerial system, implementing methodological management - with an emphasis on managerial tools which

ensure process and organizational flexibility - and professionalizing the management and managers.

Although there is a clear distinction between applying management modernization methods to an entire national defense system versus a single organization, enterprise, or unit, one can definitely see there are many similarities, and specific differences in trying this approach. One can apply these, taking into

account methods and practices from a specific entity, to the wider social level of the military organization in its entirety by keeping an eye on differences that might appear when generalizing concepts the entity works well with.

Efficiency and effectiveness should not be abandoned. The levels of efficiency and effectiveness represent a sign of economic recovery, or the reinstatement of the normal status existing before the crisis.

Unfortunately, despite the more and more evident impact of the economic and financial crisis, few Romanian organizations are aware of the fact that their management (with its viability potential) represents the make or break factor in diminishing or even eliminating the unfavorable effects of the crisis.

It is extremely simple to adopt solutions which only apparently solve the problem. Among such solutions we mention personnel cuts or sending the majority of the employees in technical unemployment. In any case, these should not be elements applicable to any military organization.

After several months of crisis in Romania, neither the government nor the firms' management has tackled the issue of the role of the management and its modernization in fighting crisis. Above this, the military continues to apply methods considered modern although with many drawbacks, as in setting the budget limits or cutting many requests from the higher level, instead of using

a different approach, which should get information on the respective demand from the source, based on the general concept of development for that organization. Actually, each time when one discusses the national defense system as a whole, one can rarely mistake in approaching any single element fitting in the defense management system. This is right because that person sees and understands both the general view and that particular element role in the system. For this to be realized at the bigger scale for the national defense system, one should take into account the following steps:

- education and information of all the participants to the process (defense resources management);

- communication at all levels realized easily and rapidly;

- control (checking and double-checking) of all requests for budgeting at all levels, continuously comparing the request against the final goal to achieve (here one can discuss a modern concept of proximity manager and "borrow" it to the military field, in order to get a better image of the local level unit interests and real needs);

- risk management at all levels of interest (analysis, evaluation, risk management plan implementation and feedback management);

- making effective and efficient use of the resources at hand, be it as low as they are, not wasting a bit

- applying the saying "I am too poor to buy cheap things" to any acquisition envisioned for the

military;

As long as one can apply these lines of operation in one's daily routine of managing the defense resources, one can speak about starting to understand the modern way of management.

The management is unanimously recognized as the most important factor in the achievement of organizational performance.

Almost two decades of capitalism have passed; however, we still pay tribute to certain change methods, such as restructuring or reform, none of which is finalized and evaluated from the point of view of its effects.

This is why today, more than ever, clear directions of managerial modernization are necessary.

One could apply the strategic management methods to the military organization (ironically, it was generated by the military end developed better by the civilian organizations that can borrow back concepts to be implemented in the military). The difficulty here is that one can find it difficult to implement strategies and methods to a military organization which, by definition, has to work perfectly during military (violent, powerful development of force, etc) action which is not equivalent to any civilian interpretation of the strategic management. This brings us to implementing the civilian strategic management rules in the military based on a comparative approach, and exclusively in time of peace. In times of war, no civilian organization

finds better methods to achieve its goals than the military ones.

In order to achieve a better defense resources management in the Romanian military, one should start from the very beginning. This is the National Security Strategy (NSS). This envisages the possible developments in the country, and closer or farther areas, possible scenarios, political, economical, social, and human conditions in our country and the countries of interest for the NSS conclusions. Also, it brings directions and general solutions to the envisaged issues by recommending different approaches to the respective problems.

Here one can insert the best risk analyses of the factors influencing the outcomes set as goals for the NSS. The current Romanian NSS has its part of risk analysis. Still, it does not get a thoroughly approached one. Maybe this is right because at the strategic level one does need a detailed analysis (which is to be developed when getting at lower levels in the hierarchy). One thing is clear: when NSS goes down in the hierarchy, each level manager should be able to understand and apply, then analyze and improve the document with additional information. This has to come and fill the gaps in information and understanding of how to make the Romanian military organization work better toward achieving the proposed goals, provided in the NSS. In other words, there has to be a permanent two-way connection and communication between the NSS

and documents issued at lower levels, in order to make sure the former is achieved by continuously adjusting the latter.

The civilian realm considers that the *implementation* of a company's strategy implies ensuring the necessary conditions for the actual achievement of objectives, namely:

- managerial conditions;
- human conditions;
- material conditions;
- financial conditions;
- cultural conditions.

As one can see, the factors one should take are similar to those in the military for the perfect conditions to be met in implementing the directives of the NSS.

Because of the existence of a disciplined and well-organized and structured environment, one could say that all these elements might be easier to implement. This is correct to the point of using the organization having clear structure, manning, equipment and resources of all kinds at disposition. Not the same can be said when the organization itself finds in a continuous changing process, restructuring (with or without effective purposes). Even the civilian organizations admit lowering their expectations and standards when applying restructuring processes or redesigning the entire organization.

And that is based on a best efficient and effective approach for the respective company. What can be said for the military that has, besides the goals set by the NSS, to manage oneself at an always lower level

of budget allocations, continuous cuts for economic crisis reasons, postponement of higher security project investments, diminishing the qualified personnel level by losing them through earlier retirement or just leaving of the military body due to much lower incomes offered to the military professionals than they would make in the civilian sector.

In time of crisis, the decision making process at high level in the defense field has its own drawbacks.

In crisis decision making the role of small groups increases, as central government intervention in crisis situations is stronger, and crisis government doctrines prove to have been well understood. That is, there is no time anymore to have a complete cycle of the decision making process, going through the classical stages of detecting the issue, gathering information, looking for alternative solution and, after simulating them implementing the one with the best outcome for the time being. The entire process involves an entire chain of people in the hierarchy contributing to the best option of the company's manager. This is doable when time does not represent an important, or the most important variable to be taken into account. When time becomes the main element of priority in the decision making process, some other methods should be used.

As stated above, small group decision-making is the one solution to be applied here. The group membership is of climax importance because that dictates the efficiency and

effectiveness of the entire decision-making process. One can see and every manager would prefer to have in this small group the fittest people to do the job of decision making. These people can see the evolvement of their decision implementation and, accordingly, adapt to what should be the best course of action for next step. Of course, again, the manager is the one to make the final decision. As long as his decision is based on a group thinking process as the above mentioned the manager cannot be wrong essentially.

Problems appear when politics interfere with the management process itself. When political representatives are experienced in the military field, their involvement is of good influence. They understand and know how to read the directions for the future military development and, also, how much investment that means. If one has to come to terms with decision responsible people but without any military education, training or involvement, it surely is going to be more difficult to let them understand what the real challenges are to the military and, accordingly, the necessary resources.

Again, in each of the two alternatives, the time becomes the variable of essence because one can get easier to the fulfillment of the time constraint goals when one has to deal with political decision-making people aware of what this means compared to the other option. Let's say that one should chose the smaller risk (in this case defined by the

professional knowledge of the field of the high level decision-making personnel) in order to get access to resources concurrent to the level of mission assigned to the military organization.

The political factor involvement is still to be analyzed further. When one can see the importance of the professionalism of the decision-makers plus the need for complete transparency of the resource allocation, there is no limit of the political factor implication. It is obvious to anyone that one is better developing the right course of action when the political will sits on the same course as the military leadership, all together on the national interests as they are stated in the National Security Strategy.

The chain of command achieves nothing if there are no political national interests in keeping and maintaining forces capable of developing actions to the performance level as it is requested in the NATO regulations for the troops assigned to different missions abroad. It is logic to understand that the other remaining elements of the Romanian Armed Forces not involved in missions under NATO should be trained and maintained at no lower level than that of those assigned abroad. It follows that one can always replace, in extenso, the currently operating forces and no one could make any critics.

Oppositely, when the political factor involvement does not imply the national interests but some personal

reasons only, nothing good for the country can come out of this. Relying on NATO support only without even taking into account the possibility of some situation occurring when one should take its faith in its own hands, can be considered lack of responsibility, at least. Still, it seems, our political factor involvement is based on personal interests only, as long as one can afford to lose well trained and ready to fight military on the basis of bringing to the same level of importance of several social group work importance.

Again, it seems part of the Romanian leadership does not consider the real importance of the military in the current international and national context and continues with so called reforms of the state in order to get more resources for other sector of the society, easier to work with in peace time.

The risk analysis developed here is not even half complete. To make it complete one should bring into discussion the external political factors, which represent, one can say, the bigger half of the whole. This remains to be dealt with in a future issue.

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ETHICS AND THE MILITARY COMMUNITY

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***Abstract:** Military communities differ in how they implement ethics training. Some have well developed programmes while others have only a few stand-alone presentations. For this reason it is difficult to produce a template to suit every situation. Leadership training within the Military is generally of a very high standard and it is particularly important in relation to the development of high moral standards, whereas the training in ethics varies considerably throughout the military world. Therefore, even though we regard our ethics programme to be of a very high standard there is always the need to review what we have in place and update it. Codes of Ethics need to be revised from time to time and we can gain valuable insight from sharing and comparing our training programmes with other militaries.*

***Keywords:** ethics, military community, leadership, moral standards, core values.*

WHY ETHICS?

A few years ago I was taking part in a seminar for Police Officers and after giving my presentation on 'Implementing an ethics programme into a Police Service' one officer asked me if I knew of any Police Force in the world with an ethics programme which incorporated the main elements of what I had included in my presentation. Both he and I were somewhat surprised. He was surprised to discover that any Police Force should have adopted such a scheme and I was surprised that he felt that few, if any, Police Forces could invest time, money and resources in such a programme of ethics.

Today, I don't believe that officer would think the same way. Since that seminar was held there have been so many scandals relating to business, banking, the church, the police, the military as well as to governments and members of parliament. Even before some of the major scandals rocked the world Stephen D Potts wrote in 1998, "As we approach the beginning of both a new century and a new millennium, there are increasing signs that ethics in public service is an idea whose time has come." [1] This is certainly true with regard to the military. In 2005, the media contained reports of charges of brutality by members of American and British Armed Forces against prisoners in Iraq. Since

then we have read disturbing and shameful reports giving details and showing photographs of some of the disgraceful activities that took place in Abu Ghraib prison as well as in certain Basra detention centres.

One of the British Army's most senior officers, Sir Graeme Lamb, was quoted in the Sunday Telegraph, dated August 22, 2005, as saying that the allegations of prisoner abuse against soldiers could fatally undermine the British Army. "We are in very real danger of losing our place in society as a highly respected British institution [...] which today stands virtually alone in the eyes of this and many other nations." General Lamb, who had himself commanded troops in Iraq, is reported to have said, "The officers and men under our command did not live up to the standard we expected of them. Those who failed were empowered when they should not have been, were left unsupervised when we probably knew they should not have been." One reason for this situation, he claimed, was because the British Army was being forced to recruit soldiers from a "morally corrupt and dysfunctional" society, where young men idolize foul-mouthed footballers. The General's comments raise a number of very important points. The failure of some soldiers and officers to live up to the high moral standards expected by their leaders does not lie entirely with the Army but with a society that has failed to equip young men and women with the moral values and principles necessary to become responsible citizens as well as responsible soldiers.

Society needs to reflect on this

and invest seriously in the moral education and character development of its young men and women, who when they are given the task of fighting wars, killing the enemy and, if necessary, giving their own lives for the sake of some just cause that they, their commanders, their government and nation believe in, will not behave in a manner unbecoming to the Army of which they are members.

THE RESPONSE

Not surprisingly, the unethical behaviour of a small minority of American and British personnel has been studied and examined in some considerable depth in order for both the British and the American Armed Forces to find ways whereby such lapses in moral behaviour by their soldiers can be minimised.

In 2006 the Pentagon announced that all US servicemen in Iraq were to undergo additional military ethics training, including lessons in "core warrior values." Renewed emphasis on the importance of core values and proper ethical behaviour has also taken place within the British Army.

The response of the American and British Armed Forces was to be expected and it will undoubtedly help in raising awareness amongst their troops of the importance of having core values and of the need to honour them as they carry out their dangerous and demanding operations.

However, whilst additional training in ethics may be of some value to the military, I believe that moral behaviour is more than behaving according to certain procedures or rules. It has to do with the type of

person the soldier or officer is. It has to do with character and virtue as well as with the social context of the community in which a person is living and working. As the British General hinted at in his newspaper interview, we need to look at these sad unfortunate incidents within a much broader spectrum.

I recall reading about a clock that hung on a wall at the back of a church. The clock had a large face and it was there for the benefit of the priest who conducted the service. It was probably placed there to remind him not to preach too long! However, for weeks the clock failed to work correctly and before it was repaired, someone with a sense of humour, attached a notice to it, which read, "Don't blame my hands, the fault lies deeper!"

THE FAULT LIES DEEPER

To issue an "Aide Memoire" to all soldiers on Core Values and revisit the subject of ethics training within the British Army was, in my opinion, not a knee-jerk reaction to the regrettable incidents that took place in Iraq some four or five years ago. In fact, in the late 1990's, the British Army deliberately set about putting more and more emphasis on one component of their military doctrine, namely, "The Moral component of Fighting Power."

Part of my contribution at that time was an attempt to make the senior generals aware of the moral background from which they were recruiting and training their young personnel. We were living, and still are, in a society in which moral

authority has become seriously fragmented. We were, and still are, part of a society in which there is considerable evidence of a serious erosion of personal responsibility. In addition, we were conscious, and still are, of the emphasis being placed on human rights without any equivalent emphasis being paid to developing the sense of personal responsibility.

I became convinced that the challenges facing us then, as now, were not only the immediate challenges such as those relating to lapses in the moral behaviour of troops on operations, but also the much deeper philosophical challenges that shaped, and continue to shape, the society from which the soldiers are recruited.

"Western society," writes Jonathan Sacks, "has been largely formed from two primary influences, ancient Greece and ancient Israel, and it owes their combination and dominance to Christianity, formed in the encounter between these two civilisations." [3]

Michael Polanyi, scientist and philosopher, is quoted as saying, "The past three hundred years have been the most brilliant in human history, but their brilliance was created by the combustion of a thousand years' deposit of the Christian tradition in the oxygen of Greek rationalism." [4]

In my attempts to paint a background for the senior officers, I wrestled with the question; Why are things as they are? How can we best understand our situation? Professor Iain Torrance, then of Aberdeen University and presently the Dean of Princeton Theological Seminary, accepted my invitation to deliver a number of lectures to senior

officers at several gatherings. One of those lectures was entitled; “The Fragmentation of Moral Authority and the Cult of Individualism”. Professor Torrance’s lectures stimulated much discussion and thought. Personally, I gained much from his contributions and afterwards I was determined to read more about what he had said.

Whilst it is not my intention to give a history lesson, it is important to appreciate just what has happened over time and I found the following parable written by the American Philosopher Alasdair Macintyre [6] most helpful. He writes, “Imagine that at some time in the future there is a widespread revolution against science. There is a series of ecological disasters. Science and Technology are blamed. There is public panic. Riots break out. Laboratories are burned down. A new political party comes to power on a wave of anti-scientific feeling and eliminates all science teaching and scientific activity. A century later, the mood subsides. People begin to try to reconstruct what was destroyed, but all they have are fragments of what was once a coherent scientific culture: odd pages from old books, scientific instruments whose use has been forgotten, bits and pieces of information about theories and experiments without the background of knowledge of their context. These pieces are reassembled into a discipline called science. Its terminology and some of its practices resemble science, but the systematic corpus of beliefs, which once underlay them, has gone. There would be no unitary conception of what science was about, what its practices were for, or what the

key terms signified. The illusion would persist that science had been recovered; but it would have been lost, and there would be no way of discovering that it had been lost.” [7]

This, Macintyre argues, is what actually happened to moral thinking in the Eighteenth Century. This period, known as the Enlightenment, “succeeded in destroying the traditions to which the key terms of morality belonged The words survived like – *good, right, duties, obligation, virtue* – but they became severed from the context that gave them sense.” [8].

Two Canadian writers, Middleton [9] and Walsh [10] explain this by using interesting and helpful illustrations of the carnival and the circus. Think for a moment about the Circus. Usually there is one central ring and this is where the main performance takes place. In addition to the main performance there are often a number of sideshows which we can view on our way in or out of the Big Top. In fact, most of the side shows are identifiable components of the main programme.

As mentioned earlier in my references to Jonathan Sacks and Michael Polanyi, the main philosophical activity and influences emanating from the “centre ring” that shaped our society for many centuries was Christianity. However, in the Eighteenth Century, at the time of the “Philosophical Enlightenment,” this influence was pushed aside, lost its hold of the centre, and was replaced by philosophy. It was believed that reason alone could and must be able to solve all moral problems and difficulties.

Christian Religion, though important in the past, had caused too many problems and conflicts and there was now a new and better way to approach our world.

Jonathan Sacks poses the question? “When the profession of a faith is no longer needed for citizenship, what else weaves the strands of private lives into the fabric of a shared existence? Nineteenth-century thinkers, with few exceptions, had no doubt. It was the existence of a shared morality.” [11]

The expulsion of Christianity from centre stage in Europe in the eighteenth century to be replaced by philosophical rational thinking is not the end of the story. In fact, the hoped for “common morality” was itself removed from centre stage. It also became fragmented to such a degree that, if we stay with the image of the circus, there is now no influential presence in the main centre ring. All that remains are the sideshows.

“Far from the erosion or even eclipse of religious belief that the Enlightenment so confidently predicted, the Enlightenment itself has been eclipsed, resulting in a veritable smorgasbord of religions and world views for our consumption.” [12]

Perhaps the most succinct summary of what has happened over the past two hundred years resulting in what we experience today, is expressed by Jonathan Sacks when he writes, “For centuries Western civilisation had been based on a Judaeo-Christian ethic. That was now being abandoned, systematically, ideologically, and with meticulous thoroughness” [13].

Macintyre writes, “We have long

assumed, that there are standards of rationality, adequate for the evaluation of rival answers to such questions, equally available, at least in principle, to all persons, whatever traditions they may happen to find themselves in and whether or not they inhabit any tradition” [14]. However, this is a false assumption. Reason alone does not solve our complex difficulties – argument is endless – the experts fail to agree.

The conclusion for some, therefore, is that “Ethical action is dependent on in-dwelling a socially embodied narrative, on membership in a concrete community oriented to a distinctive perspective, heritage and vision of life” [15]. It was Macintyre who said, “I can only answer the question, ‘What am I to do?’ if I can answer the prior question, ‘Of what story or stories do I find myself a part?’” [16]

In the light of this, there has been a suggestion that one way forward is to create “moral communities.” From within such communities there would be “tradition and reason” exercised in the process of making moral decisions. A cautious and qualified suggestion that the Army could become such a community was made by Professor Torrance.

In fact, the break up of society into autonomous entities is already part of our culture, and this is true especially in relation to ethics.

“The concept of autonomy implies that each of the various spheres of life (politics, economics, art, etc.) has its own particular set of laws inherent in the very nature of the matter which is its peculiar concern, and that these inherent laws forbid

us to bring these spheres under the judgment of ethics. For any attempt to do so would mean imposing on the sphere in question the external norm of an alien sphere, such as that of morality or of religion” [17]. Today the separate entities of business ethics, police ethics, medical ethics, military ethics, legal ethics, etc. may be a reflection of this autonomy.

THE MILITARY AS A MORAL COMMUNITY

Whether we agree, or disagree, with MacIntyre and others about the importance of ‘community’ in a world suffering from serious fragmentation of moral authority we will recognise that the military and its sub-divisions including Regiments, Brigades, Squadrons, Destroyers, Frigates etc. can be easily recognised as a community or communities, which, because of the very nature of the work, require values and standards as well as ethical guidelines on how to live and operate. The military community is not, nor should it become, a ‘cult’ cut off from the society from which it recruits its personnel, but, in today’s world, it needs its own moral compass.

WEAVING A MORAL THREAD INTO THE OVERALL FABRIC OF THE MILITARY

Military communities differ enormously in how they implement ethics training. Some have well developed programmes while others have only a few stand-alone presentations. For this reason it is difficult to produce a template to suit

every situation but, I believe there are some points that can be of use to everyone.

- 1 Self assessment.
- 2 Leadership.
- 3 Training.
- 4 Review and update.

SELF –ASSESSMENT

This involves examining what is in place at present, asking questions like- What, if any ethics training is being done at present? How is it being delivered? How is the programme structured? Who is receiving the instruction, the recruits only, or everyone? Who is delivering the training? Is there a code of ethics ? If so, when was it last updated and revised? Are there well defined core values?

LEADERSHIP

Leadership training within the Military is generally of a very high standard and it is particularly important in relation to the development of high moral standards. In this respect I wish to give a quotation from each of three scholars who have made a major contribution to the subject of leadership in relations to ethics.

“No values initiative should begin without the most senior level of management making an explicit commitment to its long-term success” [18].

“A leader’s actions must serve purposes and reflect basic values that followers identify with personally. Followers must become committed to their organisations instead of to

their leaders” [19].

“A leader’s task is to infuse an organisation with value beyond the technical requirements of the task at hand” [20].

TRAINING

As mentioned earlier, the training in ethics varies considerably throughout the military world. Personally, I believe in what might be called a two-tier programme. This involves ethics being incorporated within functional skills training as well as additional stand-alone periods on ethics. In the former the instructor, in addition to teaching his or her particular military skill, includes within the lesson a possible ethical dilemma that might arise whilst using that skill on operational duties. This method helps to make the subject of ethics more relevant and the additional stand-alone lessons on ethics complements and confirms what the students have already been made aware of throughout their entire training.

In the course of his or her training a soldier will hear or be taught about the importance of courage, loyalty and discipline. These are three of a number of core values adopted by a wide cross-section of military units and formations. However, in teaching the importance of these values it would be easy to overlook the fact that these values are shared with terrorist groups and criminal gangs. The terrorist certainly believes in discipline. He will not get drunk on a Saturday night and tell those around him in the pub what his terrorist cell

plans to do the following week. He also believes in loyalty and knows that to achieve his objectives of destruction and suffering he will need courage.

Naturally, the Military Community has adopted Core Values for very different reasons from those of the terrorist. It aims to be a good and moral community, but there are obvious pitfalls that need to be avoided. The instructor, presenting his lesson on the core value of loyalty, may leave the class room convinced that all the soldiers in attendance understand the importance of loyalty. The soldiers may indeed understand but, sometime in the future, they may limit its application to a small four-man section. If the section, during an operation, behaves in an immoral way by beating up innocent civilians, a soldier may show loyalty to the other section members rather than to his Regiment or the Army.

REVIEW AND UPDATE

Even though we regard our ethics programme to be of a very high standard there is always the need to review what we have in place and update it. Codes of Ethics need to be revised from time to time and we can gain valuable insight from sharing and comparing our training programmes with other militaries. As Michael Hoffmann says, “There is no end to the game. You never cross the goal line – you have to keep up the effort, even, when things seem to be going well.” [21]

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THE COMMUNICATIVE DIMENSION OF THE ROMANIAN SOLDIER'S ETHNIC PROFILE

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Abstract: *The Romanian soldier's ethnic profile modifies in relation with the general profile, due to the fact that representations and perceptions are conditioned by specific patterns and life experiences. Starting from the general characterological delimitation of the Romanian “individual” and relating to a study on the military students' ethnic profile, accomplished on a sample of 1,020 students, we observe a relation to the national identity influenced by the tendencies of “community” annihilation. The Romanian soldier is confronted with problems originating in the classical logic of integration/differentiation, which sometimes implies compulsions of the double compulsion. The communicative dimension of the Romanian soldier's ethnic profile is strongly emphasized by the polychronic and permissive structure and by a predisposition toward receptivity. But even this relational component involves the paradoxical approach by appealing to natural openness, doubled by the necessary precaution for protecting the Romanian identity, in the sense of subordinating to the paradoxical sign of “closing for openness”.*

Keywords: *ethnic profile, communicative dimension, national identity, axiological categories.*

1. INTRODUCTION

The ethnic profile of the Romanian soldier does not involve a category delimitation in comparison with the ethnic profile of a Romanian individual, but merely a passage of the perspective in the light of its own representations, a ‘decomposition’ of this self-perception into the frequency intervals of various states of mental, neural preparation and of various attitudes.

The profile thus constitutes a

self-description of one's beliefs/ convictions/ opinions, attitudes and behaviors in relation to everyday experience. Consequently, the ethnic dimension of the Romanian soldier entails an alteration as compared with the general profile because the array of representations that corresponds to the division instrument of the self-perceptions into frequency bands is ‘carved’ following a specific life experience and it comprises professional requirements and duties or perceptive limitations due to the systems' restrictions. As a result,

the theoretical expansion process does not appeal to an inductive reasoning, by analyzing particular stances/statements with regard to the ethnic profile of the military students. Instead, it is a deductive, argumentative process, passing from general stances/statements with concern to the ethnic profile of the Romanian individual toward particular stances/statements concerning the ethnic profile of the Romanian soldier. The role of the study "The Ethnic Profile of Military Students" [1] is of great importance due to its contribution to an outlining of the selection tools and division into attitude 'frequency bands', in the light of the representations array, adapted to the military environment (taking into account the military experience of the respondents, ranging between $\frac{1}{2}$ - 7 $\frac{1}{2}$ years, in accordance with the type of high-school attended, respectively civilian or military, and the year of study). Therefore, it is important to identify the general frame of defining the Romanian being and the filtering instrument for perceiving this frame.

"The Romanian being" – a concept by which we also understand the opening/becoming into being [2] – distinguishes itself in the place of its becoming and the adjacent terms: fireplace, paternal roof and forecourt. The Romanian being cannot and must not be isolated from the context of its becoming - a space that animate it. It rather may be described by tendencies of becoming into being (by means of instrumental values, should we refer to the tools used

throughout the research on military students), and not by its facets, or various conditions and features, or articulations resulting from the field of theoretical pseudo-convictions. Moreover, even paradoxically, "related to the Romanian being, it can be asserted, yet not imposed, in the light of a crystallized ego and as a spokesperson of an animated space, that one may not start from general rules, deductively. But one may use abductions which take into account particular cases, concrete elements, seen or read about, resulting from the Romanian people's spirit. The abductions become verifiable within the sphere from which they have been taken out; in this case, during the invoked iteration process, they revolve around a hard core, solidifying similarly to galactic matter: (successive) places into being" [3]. Accordingly, the Romanian ethnic profile does not include the Romanian soldier's ethnic profile, in an inclusion or juxtaposition of other profiles. Instead, the Romanian soldier's ethnic profile is holistic, it includes the Romanian's profile and it represents an entity homeomerically made up.

2. THE DEFINING CONTEXT OF THE ROMANIAN SOLDIER'S ETHNIC PROFILE

The Romanian soldier's ethnic profile, understood as a "prototype of the Romanian individual wearing a uniform", is structured following a set of modeling factors, starting with

the place filled with personality (“The Man brings glory to his place”) and continuing with the ethos, tradition, language, axiological attitudes and spiritual physiognomy. The ethnic profile of the Romanian military student constitutes a sum of elements gathered under an axiological attitude profile. As far as the diminished perspective over the study parameters is concerned, (nominal values in Rokeach’s table), respectively, an extension of them toward a sketch of spiritual physiognomy, by appealing to an interpretation of axiological categories with a high degree of generalization (level III, II and I categories), the Romanian soldier’s ethnic profile, cannot be investigated by taking as well into consideration such factors as ethos, place, tradition and language and by a preponderantly quantitative research. The spiritual physiognomy is rather, a good opportunity for philosophical speculations, than an analysis topic based on a methodology able to guide itself following the presuppositions and guiding lines of the Popperian philosophy.

Let us regard the individual identity – which does not involve a clear delimitation, a limited schematic definition - as a set of intermediary ranges between the individual identity and the anthropological identity of the species [4]. Otherwise, let us look at attitudes in relation with the abstract degree of their object, namely the nation, from the highest level – attitude toward the human being, and to the attitude toward self, with the

intermediary attitude stages – toward the nation and toward ethnical groups [5]. The object of our investigation is, then, one of the intermediary stages of identity, mainly, the one regarding the national identity, in relation to an intermediary leveled set of attitudes, in terms of generalization – attitude toward Romanians.

Given the situation in which the concept of citizen becomes unstable and void of meaning, and where the organic community (*Gemeinschaft*) is being replaced by the contractual community (*Gesellschaft*), the identity reference area (no matter the level at which it is accomplished) implies an unstructured mixture of arguments (*logoi*) and places (*topoi*). Inside this mixture, the quest for identity may lead to a total estrangement and to abandonment, and to the loss of references. Aware of the unstructured mixture *logoi-topoi*, “every time when a superstructure (nation, empire or else) disintegrates, we inevitably turn back to the primordial infrastructure, named *koinonía* by the Greeks, and the need for finding a *Gemeinschaft* comes again, a binding element which we “feel” and which – as we were saying- binds us and engages us” [6]. This is also the case of quests within a spiritualized space – the community-rediscovered in the genes of a nation germinating its own value systems as well. The evaporation of the community concept – no matter the type of contractual society imposing it- empire or corporation- does not occur in Romania, as long

as the reference element calls for the “eternal Romania” and not for “modern Romania”.

The moral portrait of the Romanian individual has become thinking topic starting with *Descriptio Moldaviae*, Cantemir's book, and continuing with valuable works in ethno-psychology, belonging to Drăghicescu, Ralea, Rădulescu-Motru, Vulcănescu or Noica. Still, these portraits are preponderantly drawn for indicating specific ethno-psychological features. In fact, we can mention a moralizing attempt (doubling the early moralistic manifestation of the Romanian ethno-psychology) that managed to justify the theoretical purposes of constituting the ethno-psychological references, so long as the normal state of a Romanian individual presupposes the absence of feeling of gravity. Apparently a deep-rooted people, steady in the wind, it encloses in the seed of its own nation the richness of future crops, a people that, even during hard times, is able to confine in its miraculous seed its culture, language and ethos and the warm place where the future germinates from. Thus, a feature not only of the Romanian being, but of its becoming into being becomes distinct, a feature of preservation, without alteration, of its own value systems and of the specificity of a place full of history. Maybe, in special manner, toward the common citizen, the Romanian soldier is confronted with problems originating in the classical logic of integration/differentiation or in the universal/

specific relation. The Romanian soldier perceives as paradoxical the normative framework requirements of the NATO and the genetically inherited loyalty requirements to the nation. The soldier is confronted with his own consciousness and asked to choose between the national identity, to which he is connected as to an umbilical cord, and the individual contract with a super-state institution, which he works for in the operation theaters. The soldier makes the distinction between the two statuses (in most of the situations, not contradictory), of a citizen of a country to which he is bound by oath and part of a contract with a super-state organization, mediated by the national institution that recruits him (regarded, this time, as a political entity and not a cultural one). Found himself in such a posture, the Romanian soldier will outline his own ethnic profile, in relation with the requirements of a double imposition, of the double restriction – the intrinsic one, in relation to his nation, the extrinsic one, in relation to his alliance. He will consider the differences and will activate latent potentialities that, in other circumstances, would have maintained their status. A soldier fighting for the free world's defense or acting on behalf of this concept is not a citizen of the free world. He is merely a citizen of a nation, whose culture has or has not the opening toward universal values. And from this perspective, he may take these values seriously or not, placing

himself in relation to the civilization's values, to a greater or lesser extent.

This is but a reference point of the outlining of the Romanian soldier's frame of deforming perception about self, as a Romanian ethnic. The changes undergone by the Romanian society and especially the internal changes of the military body were perceived via the same coordinates of confrontation in relation with the own consciousness toward national values and the super-state standards. The transit interval must be analyzed by the ethno-psychological research, in order to be able to outline the real dimension of the resistance to change or the capacity of adaptation to the transitory status to which the Romanian society subscribed. The ethnic profile of the military student constitutes a reference point as far as the opinion making is concerned.

3. THE MILITARY STUDENT'S ETHNIC PROFILE

The turning of dimensions as "honor", "communicative power" and "responsibility" to good account constitutes an argument in favor of understanding the Romanian soldier as a Romanian ethnic – formed in the spirit of promoting the national values, but bearing the distinct mark of the military environment in which he was formed. "Honor" and "lack of honor" are elements included in the polar system of values, they represent the bipolar universe in which the Romanian's axiological consciousness exists [7], being

affected by a not very favorable image at the exterior. Selecting this element and considering it a definition means a rather compensating measure, or maybe an exaggerated one, intended to prevent against some rejection tendencies (perceived as "Romanian citizens", in accordance with the requirements of the working instrument, the IVP), tendencies of denigration or at least, of labeling as a result of a cognitive process (stereotypical labeling) or of an affective process (appealing to prejudices) on behalf of other citizens. "Responsibility" is the mark of the forming environment and not of the Romanian individual, in general (lacking the feeling of gravity, a human having plenty of water in his blood, as Cioran used to characterize him). "Responsibility" ranks 29 out of 40 in the model study, as far as intensity is concerned. The "communicative power", in turn, being a rank 2 value in our study and a rank 3 value in the model study, constitutes the reference element, the starting point of any studies in this area of ethno-psychology. Characteristics such as hospitability, sociability, the Romanian's happiness have their roots in this "communicative power" – defining the whole nation, and it is omnipresent and positively appreciated both from the self-perspective and from the point of view of hetero-determination. Furthermore, regarding the nominal values (Rokeach), the other positively valued characteristics, either come from the nation's spirit,

such as “intelligence”, “humanism”, “friendships”, “high spirits” or “imagination”, or are the mark of the modeling military environment able to leave its imprint upon the Romanian soldier’s future personality: “courage”, “tumult”, “involvement”, “support”, “politeness” or “self-confidence”.

Concerning the level III axiological values, it is noticeable a change of the valuing tendency, of the Romanian individual who acquires lazy habits. He tends to shift from a focus on effective values (effective faber, action relation and acquired satisfaction, and less on self-fulfillment, intangible as a result of the respondents’ lack of life experience) and does not preserve the disposition or orientation values. The outlining of axiological formulas, in a similar mode with those of the model study with regard to axiological categories, level II of generality, respectively the positive appreciation of the instrumental values in relation with the finality values, level I of generality, indicates the fact that the formation background is ethnical and not professional. The Romanian soldier must be regarded as a “Romanian” firstly and not as a military employee. Thus, the affective dimension comes first, the intrinsic motivation in relation with the country, on behalf of whom a soldier acts and accepts roles derived from contractual agreements or arrangements so long as the latter do not contradict the affective dimension. The ethno-psychological perspective

highlights the Romanian soldier as a representation, in the aimed identity/alterity relation, on the background of the already reflected results by the historical imagology, but also on the background of mutations occurring or on the verge of occurrence within the dynamic field of historical becoming.

The Romanian soldier – a normative identity element – meets both the myth of national identity, upon which the Romanian armed forces become clear in the collective imagination and represents the stability element in the ample adaptation process of external forms to the national reality.

4. THE ROMANIAN SOLDIER’S ETHNIC PROFILE

Research in this field is very necessary, due to the fact that within the deployment process of values of the traditional systems and the metamorphosis process of the post-modern axiological relief there is need for stable reference points. Regardless of the amount of post-modern mutations, the Romanians preserve a certain skeptical and negotiating mood, growing roots, existing and closing “gastropodically” (Blaga) “into opening” (Noica). In a culture of stability, the ethno-psychological reference indicates an answer to the German “*Sein und Zeit*”, the British “*Time is money*”, to the old Altaic or Semitic alienation or to the contemporary American estrangement (enumeration of some of the alterity references), the closing

within the all-embracing adverb “at home” (including the way to home, the military unit, the garrison). The contemporary Americanization or Europeanization are but hibernal impressions on a field with germinating seeds, of a nation insensitive to the history’s hardships, ready to bear fruit, within the relaxation climate of the “miraculous seed”.

The Romanian soldier is altruistic, intelligent, competent, happy but also contemplative, naïve or frivolous. He answers the necessity of cultural (spatial) hedonism, in contradiction with the temporal hedonism, induced by post-modernity, and does not move away from the categorical limits, imposed by characterological portraits of the Romanian people, which has been achieved by Romanian cultural celebrities. Categorically, the Romanian soldier manages to remain a reference point, despite ideological changes that have emerged to the surface, and despite the clothes worn by the type of nationalism (based on which the myth of the Romanian armed forces becomes distinct). In other words, the change of the reference framework modifies the imagological reference only at its surface, not being able to act in depth. The ethno-psychological achieves the adjustment of self-image, by relating it to the self, in the context of its imposed functioning, under the “idealized hetero-image” regime.

5. THE COMMUNICATIVE DIMENSION

From a relation perspective, the Romanian soldier manifests his openness toward others, implicitly toward a foreign soldier. He is the representative of a polychronic culture, in which the “canonic distance”, specific to each type of relations, heads to a minimum, and which is characterized by openness toward the other. He is not the representative of a monochronic culture, specific to western peoples, and where all field of activity are characterized by planning, programming, fragmentation and selection, priorities and criteria for establishing the priorities [8]. This polychronic and permissive structure gives us the possibility of comparing the lines of the characterological portraits of Romanians, accomplished by an appeal to the Romanian philosophy, with elements of hetero-image. Searching the Romanian cultural pantheon, we discover that the “Romanian is naturally endowed with common sense, he has the compliance of the peoples suffering from many hardships, the obedience of an experienced individual” (Mihai Eminescu). With too unfortunate peoples, due to historical adversities – the case of our people, tested by all earthly evils – there appear a sort of spiritual hard shell, under which the soul takes refuge so as to remain intact” (Vasile Pârvan). ”Long and obstinate combativity does not characterize us. In all of his fights,

the Romanian individual prefers the transactional spirit [...]. The Romanian is never candid. His lucidity, his critical mind, his common sense and the feeling of realism do not allow him to be so" (Mihai Ralea). "We are a far too good people, too kind and too obedient" (Emil Cioran) etc [9], whereas the hetero-image is not discordant: K. Heitman, for example, observes that "the German invites you once, the Romanian invites you ten times", and Ruth Benedict believes that "life in Romania provides any human weakness with the chance of forgiveness" [10].

Constituting evidence of the Romanians' openness to the Other, through the cultural matrix, these aspects become cues of the Romanian soldiers' openness, in their multi-national relationships. We may characterize the relation dimension of the Romanian soldiers' ethnic profile, more precisely, the communicative dimension, by relation to the spiritual matrix in which they were formed [11]. And, since the intercultural communication depends on the spiritual matrix, it will also depend on the openness toward the Other. "The multi-sensorial universe of nonverbal communication remains open to contact, and barriers, preponderantly language limitations at first, are pushed toward their resistance limit. In fact, the place where the Romanian meets a foreigner, in the open zone allowing for a self-image comparison with the others' image of themselves, where the self-image is being built and from where cultural stereotypes

leave only to be disseminated, there is plenty of permission". [12].

The natural openness regarding the relation dimension of the Romanian soldier's ethnic profile does not represent the result of a sensitivity toward the other's values and, implicitly, their acceptance, but it lies under the precaution sign, signaled in the self-ethno-images plan by such references: "spiritual hard shell" (Pârvan), "gastropodical closing" (Blaga) or "closing for openness" (Noica). The Romanian's precaution is the one that activates the possibility of a temporary closing, of covering and regards the protection of own value systems and the interiorization, in collective mental structures, of the ethnic history. The precaution, (implicitly, the closing) are not in contradiction with the prefigured openness. The relation dimension of the Romanian soldier and his entire ethnic profile may be observed only by a paradoxical approach. We can distinguish, from this perspective, a surface behavior, oriented toward openness, toward contact, as a result of the open internal structure (see the results for the indicator "communicative power", in our study), curiosity and of the need for knowledge. It is doubled by a depth behavior, of closing, decrypted by means of the "track" metaphor [13] and by the model of holographic structure [14]. This perspective reveals the symbolical transfiguration of the whole, once the projection in any "trace" of the contact with the other has been established.

6. CONCLUSIONS

The placement under the paradoxical sign of the “closing into openness”, as a sign of the Romanian permeability in his contact with the other, presupposes, on the one side, a closing into knowledge of the external environment into the internal environment, and on the other side, the receptive permeability and the gradual broadening of the area of conventional meanings, through a “protection mechanism of own values that are highlighted once a common value zone has been discovered, a precaution mechanism regarding the approach during the contact with the other” [15]. Consequently, we can say that the relation availability is an attribute of the Romanian individual, in general, of the Romanian soldier, in particular, and that the structuring of an ethnic profile for the Romanian soldier contributes to the communicative profile outlining of the latter.

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NATO CONCEPT EVOLUTION – CONSEQUENCE OF THE CHANGES OCCURRED IN THE INTERNATIONAL SECURITY ENVIRONMENT

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Abstract: *We initiated our endeavor starting from an undisputed reality, that is, NATO changes its strategies and, implicitly, concepts, according to the developments occurred in the international security environment, in order to be able to respond to any challenge operatively and adequately. We would like to emphasize that regardless of the concepts formulation and application, the Organization’s fundamental values, and particularly its purely defensive character and the principle of collective defense do not alter.*

Keywords: *NATO concepts, international security environment, changes, unpredictable and complex challenges.*

Throughout its existence, the North Atlantic Alliance has been permanently preoccupied with the alignment of its strategies and concepts with the alterations occurred in the international security environment, which is extremely fluid and unpredictable, and marked the worldwide community’s evolution after the Second World War, in order to respond to the challenges that threatened peace and democracy so difficultly gained. The historical events of the last decades have changed the world and led to increasing attention paid to develop doctrines and actions, for some threats have appeared and affected large parts of the planet, requiring immediate response in order to avoid

tremendous life losses. One could hardly put these events into a certain order of importance, but one must mention the collapse of communism, terrorism, and nuclear threats.

In our opinion, a crucial moment in NATO’s strategic evolution is the dissolution of the Warsaw treaty, for the enemy was becoming harder and harder to identify, which called for a new course of action. It is interesting to mention what one of Gorbachev’s collaborators, Alexei Arbatov [1], stated: “The USSR will do you the biggest harm possible: it will deprive you from your enemy” (“Le Figaro”, Paris, 10 January 1990) [2].

When this assertion was made, few analysts took it into consideration, but when the Warsaw treaty ceased to exist, one could notice how

necessary it was to modify NATO's strategy, among which we consider that the most important ones are those elaborated during the summits of Rome, November 1991 and April 1999, Washington, and the new concept developed after the Summit of Strasbourg / Kehl, 3-4 April 2009, which is to be approved during the next NATO reunion, by the end of this year.

We do not intend to elaborate on these concepts, but rather present their main provisions, in order to notice how much they have changed in no more than two decades, whereas the process of NATO concepts and strategy adaptation is still on going.

All the three concepts we envisage emphasize the concern to preserve the North Atlantic Treaty Organization's fundamental values: defensive character, collective defense, and the Alliance's military dimension as the means to reach these objectives.

The principles of the 1991 concept may be concentrated as follows: the Alliance has a purely defensive character; security is indivisible, and an attack upon one of its members is regarded as an attack upon all the members; NATO's security policy is based on collective defense, including an integrated military structure, as well as on cooperation agreements; the preservation of an adequate balance of nuclear and conventional force in Europe is necessary in the light of the foreseeable future.

Mention should be made that in only eight years the situation has changed so radically that the 1999 concept brings about significant changes related to new courses of action: the Alliance should assume not only collective defensive roles, but also roles in ensuring peace and stability in the greater Euro-Atlantic area, thus contributing to conflict

prevention; maintaining structures and procedures appropriate for conflict prevention and crisis management, effective partnership with non-NATO countries on cooperation and dialog premises; Alliance enlargement by applying an open-doors policy for potential new members; continuing the effort for disarmament and non-proliferation in order to ensure stability in the Euro-Atlantic area based on the consolidation of democratic institutions and peaceful conflict resolution; mediating and advising the allies in matters affecting their vital interests; protecting NATO members from any threat and aggression; promoting partnership, cooperation, and dialog with other countries from the Euro-Atlantic area in order to ensure transparency, mutual trust, and action within the Alliance; strong engagement in the transatlantic relationship; maintaining the Alliance's military capability to increase military operations' efficiency; a more comprehensive approach to security in the sense of including political, economic, social, and environmental factors. One can notice the introduction of a two phrases that play a crucial role in the Alliance's way of action: "out of area operations", and "non-article 5 operations", which have been widely discussed and debated.

During the summit of Strasbourg / Kehl, 3-4 April 2009, the state and government leaders of the NATO countries have required that the Secretary General should elaborate a new NATO strategic concept known as the new concept NATO 2010. This task must be completed by the next NATO summit, which is expected to take place towards the end of the year 2010.

The Secretary General will summon and lead a large group of

professionals who will establish the reason for a new Strategic Concept. This will be accomplished in active collaboration with NATO most important decisional structure, the North Atlantic Council.

The first question is: why does NATO need a new strategic concept? And the answer may be the following: a transatlantic consensus of NATO's roles and missions regarding its strategy to address the security challenges is essential for the organization's proper functioning; the strategic concept is NATO's fundamental document which establishes and reflects this consensus; the security environment has changes, therefore the Alliance must update the current concept of 1999, when NATO had 19 members, compared to the present 28 members; NATO must focus on European challenges; the new Strategic Concept must be developed and approved by all the 28 members; it must take into account the security challenges' evolution, that is, the emphasis on energy supplies; terrorism, and climate changes; the new Concept shall not be merely an analysis document. It will have to provide the member countries with guidelines concerning the way to further transform the Alliance to successfully accomplish NATO fundamental roles.

NATO's main duty is reiterated: collective defense, as follows: the 5th Article does not change, but its requirements have altered in their form; the member states protection from armed aggression must be sustained not only by military capabilities, but also by drawing up plans for crisis situations, rapid reaction, and logistics.

Protection from non-conventional threats remains of paramount

importance as NATO stays focused in this respect, with an emphasis on threats related to weapons of mass destruction, terrorist and cyber attacks; to ensure its security, NATO must update its approach to territorial defense.

An extremely important issue is to establish orientation directions for operations outside the Alliance's borders, for NATO cannot be the sole answer to every problem affecting international security; NATO is a regional, not global organization, and its authority and resources are limited, which is why the new concept must offer guidelines in making decisions connected to operations abroad.

The new concept aims at enabling success in Afghanistan, because: NATO's mission in Afghanistan is of unprecedented magnitude in the Alliance's history. NATO's experience gained there is a valuable source of lessons learned in terms of cohesion, efficient planning, and public diplomacy, civil-military matters, and the need to deploy forces at a strategic distance for a long period of time.

Emphasis is placed upon the necessity for permanent consultation in order to overcome or manage crisis situations, starting from the following facts: given the current risks, the allies ought to be more creative and take advantage of the article 4. It refers to preventing crisis situations prior to an imminent threat, which would require imposing the article 5. The 4th article fosters information exchanges and opinion convergences [3].

A new partnership era is envisioned: the new strategic concept must admit that the NATO of the year 2020 will not act alone; NATO must clarify and thoroughly examine its relations with the key partners, as well as to initiate new relations and

widen the partnership coverage.

The new international situation implies complex involvement in complex matters, as follows: sound partnerships provide NATO with the opportunity to continue searching for solution to complex problems affecting security; generally speaking, a complex approach should combine military and civilian elements.

The new concept comprehensively deals with its relationship with Russia: the NATO-Russia partnership was conceived as a way to ensure security in the Euro-Atlantic region; the Alliance remains focused on this objective. The main communication forum is the NATO-Russia Council, which has not always been used properly, but was set up to prevent crises, examine events, and decide upon common actions. Although the Alliance and Russia do not regard each other as a threat, there are doubts on both sides in terms of the other party's intentions and policies. One should reiterate NATO's willingness to support the instauration of a Euro-Atlantic order based on cooperation with Russia alongside restating that the member states' security and interests will be protected. The envisaged objectives in this respect refer to non-proliferation of nuclear weapons, armament control, counter-terrorism, anti-missile defense, crisis situations management, peace operations, maritime security, and fight on drug dealing.

The open doors policy is maintained on the following premises: since the end of the Second World War, NATO has reached a number of 28 member from 16; this policy has been a progress engine for building a free and united Europe; the new accessions refer to western Balkans, i.e., Georgia and Ukraine. The process regarding to

new memberships must continue as every candidate meets the accession requirements, for NATO is based on voluntary membership.

The nuclear policy is on going: peace support solidarity implies the following: NATO's military and political engagements are meaningless unless they are supported by capabilities; the strategic concept should include the clear presentation of defense priorities accompanied by a set of new or improved reforms; NATO forces must be able to protect the Alliance's territory, to assume missions at strategic distances, to contribute to building a safer security environment, and to address various issues where and when required. Therefore, there is a need for continual NATO's forces transformation from the powerful, but static status (during the Cold War), to a flexible and mobile one nowadays.

A new mission emerges now – the anti-missile defense, as defense against a ballistic missile attack in Iran led to an essential mission for NATO, when Barack Obama's decision was to deploy an anti-missile shield will provide a more rapid and efficient protection than the previous one. Also, the anti-missile defense is placed in a NATO context, for it is more efficient when performed as a common action, within which NATO-Russia cooperation is preferable.

The new concept attempts to address the cyber-attacks risks, starting from their increasing frequency. Consequently, NATO must enhance its efforts to face up such threats by protecting its own command and communications systems alongside helping its members to prevent and recover from such attacks, as well as to develop their defense capabilities in this sector.

The aforementioned are possible

by implementing reforms to build a more agile alliance, so the new strategic concept should authorize and encourage the Secretary General to continue the reforms meant to make the Alliance more capable of making quick decisions, including the costs point of view.

The new concept 2010 was anticipated in an interview for the PE site given by mr. Anders Fogh Rasmussen [4], NATO Secretary General, in November 2009. The main idea he starts from is that “it is all about consensus building”. The interview is considerably ample, but – for the relevance of our hereby endeavor – we shall concentrate on its final part, when mr. Anders Rasmussen [5] answers two fundamental questions for the Alliance’s future, which we will reproduce entirely:

1. Is NATO overstretched, if there were another conflict would it be able to find the resources?

NATO is currently the world’s strongest military alliance with a huge capacity, but of course right now we are very much focused on our mission in Afghanistan, because a lot is at stake for the Afghan people, but first and foremost for our own security and for the international community. Let me stress why we are in Afghanistan. It is because of security. The terrorists who attacked the US on 9/11 2001 were rooted in Afghanistan and the following day the NATO alliance invoked, for the first time in its history, Article 5, the collective defense clause, which states that an attack on one member is considered an attack on all of them. The mission is still not accomplished - so right now we are focused on Afghanistan. This is also about territorial defense. I would like to stress that the core task of NATO

is territorial defense of allied nations but we have to realize that in today’s world the defense of our own borders very often starts far away like in Afghanistan, so right now this is our number one priority.

2. NATO is in the process of developing a new strategic concept. Countries like the US, the UK, Holland and Denmark prefer a more global strategy, while France and many of the newer member states would prefer a more regional focus. What would you prefer?

I don’t see any contradiction. This will be one of the core items on the agenda in our new strategic concept exercise. Since NATO was established 60 years ago territorial defense according to article 5 has been our core function it will remain so! Today, we are also faced with new threats, including cyber attacks, and in order to address these new threats properly, we need to transform our armed forces. Around 70% of our armed forces in Europe are stationary. I think that if we are to make our territorial defense credible, then we have to make sure that we can actually move people around, we have to have a more mobile, a more flexible and more deployable military. In conclusion, I do not see any contradiction between territorial defense and a global reach and a global perspective. My role will be to build this bridge.”

In the hereby article, we have attempted to bring forward arguments to sustain the idea that NATO is undergoing a remarkably dynamic transformation due to the frequent, profound, and unpredictable changes occurred in the security environment worldwide. After the NATO summit at the end of this year, when the new concept 2010 will be officially approved, we will return with

potential new aspects emerged in the wake of debating it in the presence of all the Alliance's members.

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REVIEW OF MODELS AND ANALYTIC INSTRUMENTS IN OPERATIONAL MILITARY DECISION MAKING PROCESS

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Abstract: *In the era of IT, the high level military decision making process (MDMP) made a lot of progress. The focus is on building a framework capable to offer an effective tool for decisions in the field of force planning and operations planning.*

The complexity is influenced by the fact that high-level decision making occurs in uncertain environment that affects an extended set of factors (political, military, economic, social, information, infrastructure). The response based on different type of instruments (diplomatic, information, military, economic) should be supported by a new framework, capable to offer the power of selection is given by the limitation of resources. The use of modeling and simulation offer a better understanding of the concepts and solutions for commander’s decision making.

The effective way to adopt a flexible, adaptive, and robust solution is totally different from the classic planning and is better focused on the exploitation of the strengths elements of the human creativity and knowledge. New analytical framework will offer also effective instruments in real time, capable to support the optimal decision making.

Keywords: *MDMP (military decision making process), DSS (decision support systems), CoA (course of action), modeling and simulation (M&S), the inspiration from economics*

1. AN INTRODUCTION IN THE ANALYSIS OF INNOVATIVE DSS FOR MILITARY APPLICATIONS

DSS (decision support systems) are represented by advanced rational/analytic instruments capable to offer an integrated framework and a robust basis for commander decision making. All levels of commanders but especially high-level decision is

influenced by the risk and uncertainty, and the impact on the real selection of a course of action (CoA) is significant. In the typical framework of a high-level DSS consistent with an uncertainty, sensitive, top-down approach is important to transform the vision about dealing with risk and uncertainty, and providing a dynamic recognized picture of the battlefield, the comparative potential of actors and their logistics, equipped with

zoom capabilities.

In the literature (Davis, Kulick, Egner, 2005) are presented some aspects regarding DSS: risks and risk mitigation should be covered effectively, and provide multiple mechanisms capable to create dedicated FAR strategies; the focus is on the ways to mitigate the risks in the context of FAR strategies; it offers more intuition in the design of different solutions, but also hedging strategies; dealing with all relevant factors offers new opportunities for commanders.

In the modern military systems and processes the interest is to move toward a flexible, adaptive, and robust (FAR) strategy. There are different types of high-level MDMP from analytic to intuitive/ naturalistic to rational/analytic. DSS designers tend to favor rational-analytic methods, but real-world commanders often lean toward intuitive methods, arguing that models and simulations could not respond to the FAR (flexible, adaptive, robust) strategies.

But, in the modern literature, it is recognized that the top-down decision support should accommodate both types of thinking, attempting to exploit the strengths and mitigate the weaknesses of each and is based on the both lines: rational commanders are aware that the options presented to them may lack creativity, imagination; intuitive commanders are aware that risks exist in executing their strategies. A mix between the two types of thinking could be interesting. One candidate for this mixed framework is based on the portfolio-style method, inspired from economics, and capable to balance the risks, and the foresight exercises method, inspired from psychology, that addresses the need to include human factors in dealing with high

risk and uncertainty.

The new framework to adopt FAR's style decisions, is different from planning for the best-estimate future and should include both innovative rational models like agent-based models, issues taken from control theory, game-theoretic simulation, the operations research, applied to military systems, but also human-intensive methods (war-gaming, foresight exercises, Red-teaming, assumption-based planning), based on creativity, expertise and intuition, but poorly structured. This new framework should offer a better understanding of the mechanisms of high-level military decision making, based on an innovative mixing of the emerging analytical methods and the instruments from the intuitive decision making style that capture the strengths of the components.

2. BASIC ASPECTS OF RISK, UNCERTAINTY AND SELECTION IN HIGH LEVEL MDMP

The classical concept of defense planning should be related to the need to identify areas in which the decision makers search for more risk (Henry, 2006), in order to identify gaps in capability areas and to find activities that can be supported by less funding in order to pay for the gap-filling. This is in fact a new way to implement the classic concept of the challenge of programming and budgeting (Hitch, McKean, 1965). The actions needed to balance budgets intelligently involve risks and the concept of balancing risk, inspired from the economic analysis express the ability to take more risks in some areas to pay for filling capability gaps in others.

In classic military organizations,

subordinates salute the plan too uncritically, rather than helping the commander to identify and avoid problems inherent in the plan. There are strong-willed commanders who resist suggestions, and are intuitively inclined to participate actively, but also commanders who are always saluting political level directions.

The battlefield and military systems are represented by enormous and deep uncertainties, and this implies risks but also signal potential opportunities. The concept of deep uncertainty (Knight, 1921) cannot be adequately treated by using simple random processes and cannot realistically be solved in near real time. Deep uncertainty should be acknowledged in the planning process by considering alternative courses of action (CoA) and by implementing a better understanding of the possible effects of operations.

High-level decision making is responsible for establishing and pursuing suitable visions and formulates the basic operational objectives. The focus is to obtain a framework capable to offer a proper design of operational objectives and actions. In addition is necessary to identify detailed and more-specific objectives expressed this time in the language of effects. Commanders analyze the documents offered by the analyst, focused on the relative ability of CoA to achieve all objectives and related effects, and extend the vision over the core subset offered initially.

In the new complex scenario-space typical in recent conflicts, characterized by deep uncertainty, are not understand the characteristics of the probability distribution. In the case of an imaginary strategy of a future adversary, the entire framework is hypothetical and unknowable. The deep uncertainty about the

adversary's strategy is expressed by the lack of knowledge, in a similar way of the treatment in PMESII (political, military, economic, social, information, infrastructure) domains and attempts different DIME (diplomatic, information, military, economic) instruments.

The basic methods for analysis the future uncertainties (Davis, 1994, 2002; Davis, Gompert, Kugler, 1996) are focused on a better understanding of the concept of the capability to adapt the networked forces (Gompert, Lachow, Perkins, 2005; Tilson, 2005) in the context of mixing FAR strategies (flexibility- the ability to perform different missions; adaptiveness - the ability to adjust readily to diverse circumstances; robustness- the ability to withstand both foreseen and unforeseen shocks, such as surprise attacks or the loss of an important battle).

The treatment of deep uncertainty in the operational risk could be also proceed by using the Adaptive Planning (Bankston, Key, 2006; Hoffman, 2006), a concept oriented primarily toward normal periods, for the conception and the development of operations plans in terms of capability packages, in a proper manner that can enhance the adaptability. In analytic decision making, the treatment of uncertainty could be expressed by using alternative CoAs. Based on its intuition, the commander is then focused on improving the basic plan and providing staff evaluations of options (most-likely, best-case, worst-case). The commander reviews quickly the underlying analysis and try to be synchronized with the analyst's thinking and matched with his own character (conservator/ risk-avoiding vs. ambitious/ risk-taking).

In conclusion, military DSS should better address the quantitative

elements of uncertainty, risk, and choice, hierarchically, at different levels of abstraction, in a more effective way, capable to encourage the development of FAR strategies. The mix framework to evaluate and improve CoA in an uncertain environment is realized by using analytic methods (war-gaming, human gaming, Red-teaming, assumption-based planning, agent-based models, exploratory analysis) and agent-based models, that should be more focused on human methods and should be better adapted for a simple use by commanders. DSS support should include the credibility of estimated confidence levels as a function of process. If the assessments are based only on in-group judgments the credibility is low, but if the judgments reflect Delphi or other techniques, the judgment is more credible.

3. REQUIREMENTS FOR A MILITARY DSS FRAMEWORK INSPIRED FROM ECONOMICS

Defense spending is characterized by cyclicity, and in crisis periods, like the period 2008-2010, budget crunches could put pressure on important programs, could exacerbate the under funding of other programs and could stop the recapitalization process of materiel used in recent operations.

For all styles of defense planners, DSS should facilitate the economic selection, but for commanders, the resource issue is less focused on budgets, but more focused on the survivability of people and materiel.

The portfolio management is an approach inspired from economics, is an effective instrument for the treatment of risk, based on a top-down mechanism evaluation equipped

with cost-effectiveness analysis and the mathematics of aggregation. In strategic decision-making, the use of orthogonal strategies is limited by the scenario space of the possible strategies, but the optimal output should be filtered and mixed, because of the multiple objectives and the use of FAR strategy. The use of orthogonal options in an analytic process should be based on a flexible selection mixed with dynamic adjustments, but in this complex task, the portfolio perspective, becomes more intuitive and effective. In the classic portfolio-management approach, investments are operated in different types to realize a balance among conflicting objectives.

In defense planning, objectives are more complex and is difficult to asses the likelihood of subsystems/elements but a portfolio might involve activities capable to support the general objectives, to maintain the military capability, and to avoid different types of risks. In this approach setting priorities and adjusting the weights of effort within the portfolio is important in the context of limited resources.

In the literature on defense planning (Davis, Gompert, Kugler, 1996; Davis, 2002; Hillestad, Davis, 1998; Dreyer, Davis, 2005) are also presented the key aspects of a portfolio- management framework, that responds to military FAR restrictions: the routine to use portfolio management tools; it responds to assessment of critical-component capabilities, costs, and benefit-cost ratios (near, mid, long term, anticipation of strategic adaptations); portfolio adjustment fill gaps, balance risks and opportunities, prioritize by packages, and conduct marginal or chunky marginal analysis; it offers more levels of zoom where

needed in a clear assessment; it offers parametric capability models for comprehensive analysis; it permits the development of families of models, games, experiments.

This framework should support the commander's decision regarding the adjustment/ tuning of the portfolio so as to fill the gaps, balance risks/opportunities, prioritize by groups rather than by discrete activities, and even to conduct investment analysis, such as marginal or chunky marginal analysis. Commanders are focused on the dynamics of the adjustment, the flexibility of levels of zoom or drill-down. The treatment and the representation of the risk within a portfolio-management DSS is based on the following risks: acquisition risks (feasibility, cost), at-the time strategic risks (warning and decision time, allied permission to use bases), operational (effectiveness in achieving the principal effect sought, control of collateral damage, perceptions, behaviors), subsequent strategic-effect risks (the risk that a coalition will disintegrate, the fragility of domestic support). The set of risks includes risks involved in acquiring the capabilities in the first place, risks associated with their usability when needed in crisis or conflict, operational risks when actually employed, and risks associated with negative strategic effects (e.g., international perceptions) even if the operation itself is successful and achieves the desired operational-level effects. The representation of different types of risks in a portfolio-oriented DSS is difficult to be realized in a top-down architecture that needs to achieve comprehensibility. Some authors (Davis, Shaver, 2008) propose the following principles in the treatment of risks: the use of measures of effectiveness for both

normal and extreme risk cases; the use of composite risk indicators.

The interpretation of the analytical results from detailed technical calculations (the so called zooms) should be easy understandable by using intuitive charts and simple logic tables, and tuned by a combination of intuitively variables, charts allowing interactive response to questions, and simple logic tables.

Portfolio-management instruments are well adapted for the top-down perspective, but not for going into much depth. A candidate ingredient is the exploratory analysis, in which all of the key parameters are varied simultaneously so that one can understand results as a function of those parameters in the complex n-dimensional space. In the cost benefit analysis (CBA) the most important issues are the following: a mechanism for exploring the consequences of different perspectives about the relative importance of different missions and constraints and the relative probabilities of various risks; there is a need for marginal analysis (where to spend/ cut) and a more chunky type of analysis that uses larger increments of spending/ cuts; the use of cost-benefit strategic comparisons on large composite options.

4. THE HUMAN GAMING INGREDIENT IN MDMP

The foresight approach seeks the potential drivers of change relative to a simple extrapolation. In uncertainty, planning based on extrapolation is difficult, and the drivers of change are rarely fully controllable. Although the development of foresight methods first occurred in nonmilitary applications, the central ideas are part of an ongoing interaction between

military and nonmilitary thinking.

Indeed, the use of human gaming ingredient in the form of foresight exercises could offer a good support for commander in creating and evaluating optimal CoAs. In military, the foresight approach is focused on building potential CoA in an attempt to obtain the desirable output.

In the absence of an efficient vision of the future potential of forces, commanders build different visions (scenarios) capable to offer a logical and consistent picture of the future, and then, elaborate the plan. In real world, the interest is to select scenarios that are intrinsically interesting or to decide which of the interesting scenarios could be used in planning. The challenge is to define a set of scenarios that, if used to challenge our planning in different ways, will provide adequate insight into the larger scenario space of interest. The creation of scenarios can be described as a set of tasks: expanding, structuring, focusing, assessing, and constructing.

The first step is to expand the evidence base, and to include all the elements (L factors) or relationships (R factors) is included. Then, the analyst put form onto the information that has been collected. Expanding and structuring of tasks is not linear in time but is interactive and build the relational database in the collective mind of experts. To maintain coherence and comprehension, the foresight exercise should have a focus, based on objectives. The assessment tasks match the uncertainty of the scenarios with the aspects of the future taken as certain and the CoA, and identify the number and nature of the scenarios to be taken into account. Finally, the scenarios are build in a concrete, logical, meaningful, and thought-provoking

manner, in anticipation of requests for more information.

5. THE USE OF THE CONCEPT OF FAMILY OF MODELS IN MDMP

Operation planning should be matched with the strategy of multiple goals, capable to improve the probability of success. This is not a pure strategy and it should includes heavy preparation of the battle space (air power, ground maneuver forces, information operations) and is design so as to avoid unnecessary collateral damage. An efficient use of alternative ways to achieve FAR strategies should be also considering portfolio-management techniques.

The key functional needs for analysis and supporting modeling and simulation include: routine and perceptive treatment of uncertainty, emphasis on FAR strategies, adaptive models and reinserting human capital in modeling and simulation and the use of the concept of family of models could offer a better functionality. The particularities of the concept of family of instruments to support analysis would include: a diversity of models with different levels of resolution, perspective, and character and different degrees of interactivity; human games and other exercises structured to increase the analytical aspects; experiments for integration and representing phenomenology, other empirical work and consultation with experts. Strategic simulations for (multi)theater strategic and operational levels can have good capability for analytical functions, decision support, and integration, but the models are not adaptive.

Agent-based models in bottom-up architecture have modest ability to explore phenomenology and human

action. Detailed models are important at low and intermediary levels, but are poorly suited to higher-level analysis or DSS, due to uncertainty. War-gaming offers agility and high speed to deal with previously unstudied issues. Multiple scenarios, can improve war-gaming offering a good focus on real factors, including human perceptions and behaviors. Field experiments offer an integrated picture that includes human issues.

The human factor should be used more effectively in modeling and simulation, and DSS (human gaming, use of experts). Human games are idiosyncratic to players, focused on the playing through of a single scenario, undocumented, and relatively unstructured. In this case, games can be used for the following analytical purposes: discovery, sensitization, concept development, knowledge elicitation, identification of assumptions, and testing of hypotheses. In the literature is presented how to make human war-gaming more effective (Davis, 2004): the use of a design focused on vignettes with relatively well-described situations; the use of competing teams with different backgrounds to see/test diverse tactics and assumptions, and to encourage teaming and team protection; to implement record planning factors and reasoning used during team play; a more effective use of Red teams, both to better appreciate different ways of assessing the situation and defining objectives.

A different approach (Davis, 2002) for using humans and gaming to help inform and tune adversary models is based on the following aspects: it is necessary to develop a theory and structure for understanding possible high-level adversary decisions and behaviors;

the use of war-gaming to check on the adequacy of the factors and structure and to test the theory in extreme, difficult or ambiguous situations; the generation of alternative adversary models, each of which, parameterized to reflect inherent uncertainties; the integration of the exploratory analysis to develop candidate FARs. Another version (Santos, Zhao, 2006) address how adversary modeling can be accomplished focuses on inferring the intent and developing the consequences of that intent for subsequent actions in a dynamic environment. In the case of optionally interactive simulation, where humans may be used to make C2 decisions, such as shifts in strategy or commitment of reserves, the simulation should take into account the following: a better representation of the plans in the simulation; the possibility to do the simulation with interruption points at which humans review the situation and, as necessary, make adjustments in the strategy; the introduction of new action sets and rules.

The additional requirements refer to a more intuitive capability to build strategies and a more simple way to build easily accessed libraries of building-block actions.

Another strategy is based on making better and more systematic use of experts. The focus is on the following methods: Delphi (Helmer-Hirschberg, 1967; Linstone, Turoff, 2002), Analytic Hierarchy Process- AHP (Saaty, 1999), Value-Focused Thinking- VFT (Parnell, 2004), Subjective Transfer Function Techniques- STFT (Veit, Callero, and Rose, 1984), Scenario-Based Planning- SBP (Schwartz, 1995), Day After Games- DAG (Mussington, 2003), Uncertainty-Sensitive Planning – USP (Davis,

2003), Assumption-Based Planning-ABP(Dewar, 2003). In the literature (Davis, Henninger, 2007) are also presented the main difficulties related to these models: the real capability to find/ and select the experts; the problem related to the group dynamics, such as effects of hierarchy and social context, and the well-known group-think phenomenon; the effective cross-disciplinary discussions when experts from diverse disciplines often have different languages, assumptions, and tacit knowledge; the tendency in the expert discussion/ group of experts, to move toward a best estimate or consensus, rather than exploit the opportunity to see distributions of possibilities.

6. CONCLUSIONS

There is a clear interest for the building of a framework capable to offer high-level decision support, in high uncertainty, in operations, or planning. Modeling and simulation should be more oriented toward FAR (flexible, adaptive, robust). The adaptiveness may be achieved by having submodels that adjust simulated strategy and tactics depending on objectives, situation, and projections or submodels representing the behavior of individuals (adversary leaders), groups, or countries. The elements to improve adaptiveness include using agent- based models, control theory, game-theoretic methods, innovative model-related operations-research algorithms, in different styles, deterministic, stochastic, hybrids.

The principles for building a military DSS capable to serve high-level commanders are analyzed and it is also presented the possibilities to use and adapt the inspiration

from classic portfolio-management methods mixed with human gaming. This strategy of mixing leads to an effective implementation of FAR strategies, based on a better exploitation of the human innovation in adaptive models

The future design of DSSs should be focused toward the use not only on the classic modeling and simulation, but also on human-intensive methods such as war-gaming, foresight exercises, Red-teaming, assumption-based planning, and various methods for using experts.

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WARFARE IN THE INFORMATION AGE

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Abstract: *The paper is focused on changes occurred in military organizations in Information Age. During Industrial Age the military structure of forces evolved according with principles of decomposition, specialization, hierarchy, optimization, deconfliction, centralized planning, and decentralized execution. But now the solutions based upon Industrial Age assumptions and practices will break down and fail in the Information Age. This will happen no matter how well intentioned, hardworking, or dedicated the leadership and the force are. Two key force capabilities needed by Information Age militaries are interoperability and agility. Both interoperability and agility are provided by Network centric warfare theory of war.*

Keywords: *information, warfare, network, command, control,*

1. INFORMATION AGE

“Ages” are proclaimed when something happens to cause a discontinuity in multiple dimensions that affect civilization. Economics and power are historically closely related. What distinguish the Information Age from the Industrial Age are the economics of information and the nature of the power of information. With the coming of the Information Age, there is an opportunity to provide widespread access to information-related services and capabilities only dreamed about in previous eras. This increased access to information provides an opportunity to rethink the ways that we organize, manage, and control. For the very first time in history the information power burst the efficiency at such level which

is very difficult and expensive to be overcome by mass.

The original precept, *knowledge is power*, conveyed the notion that an individual’s worth was related to their possession of information. The more exclusivity associated with the possession, the more valuable the information. Hence, information was a commodity like any other commodity, whose value was related to scarcity. Individual and organizational behaviors reflected this value paradigm. Hoarding information and exploiting its scarcity have been the norm for some time.

These behaviors can no longer be tolerated because the economics of information have changed. With the cost of information and its dissemination dropping dramatically, information has become a dominant factor in the value chain for almost

every product or service. As the costs drop, so do the barriers to entry. Hence, competitors in many domains are seizing on the opportunity provided by “cheap” information and communications to redefine business processes and products. These trends apply to the realm of national security as well. Information Age concepts and technologies are being adopted by many nations.

The military response to the Information Age is Network Centric Warfare.

2. INDUSTRIAL AGE LEGACY

The term network-centric warfare broadly describes the combination of strategies, emerging tactics, techniques, and procedures, and organizations that a fully or even a partially networked force can employ to create a decisive war fighting advantage. The key to understand the term network centric warfare is command and control (C2) approach. Command and Control (C2) is the common military term for management of personnel and resources. The principles underlying traditional command and control apply not only to Industrial Age warfare, but also to Industrial Age economies and businesses, are decomposition, specialization, hierarchy, optimization, deconfliction, centralized planning, and decentralized execution.

The principle of decomposition is applying a “divide and conquer” mentality to all problems. The practices of separating combat into land, sea, and air (and space), are

an example of decomposing warfare into manageable pieces.

If a sound set of decompositions is made, then these organizational subsets of the organization can develop professional specialties that help the overall organization to perform its mission and achieve its objectives. In military affairs, specialization (creation of career branches and very specialized organizations) enabled much more efficient career development and training. During military operations, the specialized capabilities often generated capacities that simply could not be created by groups of generalists.

The organizational consequence of Industrial Age specialization is hierarchy. The efforts of individuals and highly specialized entities must be focused and controlled so that they act in concert to achieve the goals of the larger organizations that they support. The size and the number of levels that separate the leader(s) of an enterprise and the specialists that are needed to accomplish the tasks at hand are a function of the overall size of the enterprise and the effective span of control. The number of layers is a function of the span of control. As the span of control decreases, the number of layers that are needed (for an organization of the same size) increases. In such hierarchies, information needs to flow up and down the chain of command. This is true of policy information, plans, orders, and information about the battlespace (both reports about the enemy and reports about friendly forces). The more layers, the longer this takes and the higher the probability of

an error or distortion. Even today, correspondence to a member of a military command is formally addressed to the commanding officer of the unit and is then distributed by the headquarters. In other words, all information intended for subordinates is recognized as belonging to and flowing through the hierarchy. Indeed, control of information was a major tool for controlling Industrial Age organizations.

Industrial Age militaries decomposed the battlespace, created layered organizations, divided into specializations, and organized forces into hierarchies. Thinking that this approach transformed the complexity of war and large operations into a collection of simple, manageable tasks and problems, the Industrial Age military felt that they were able to focus on the optimization of processes. Virtually all Industrial Age militaries created “approved scenarios” against which their threat-based decisions were optimized. Of course, they experienced difficulties when forced to fight against military organizations other than those they had planned against.

Given that the elements of military forces were optimized for specific missions under well known and understood circumstances, Industrial Age command and control processes relied heavily on control measures that would deconflict the elements of the force. The ultimate goal was to provide each element of the force with the best possible operating environment.

This was a natural consequence of specialization and optimization. Deconfliction is far better than

conflicted operations (where friendly units impede one another), but it falls well short of the performance possible when military assets are employed synergistically.

Planning became a crucial part of Industrial Age command and control because it enabled commanders to arrange forces and events in time and space so as to maximize the likelihood of success (mission accomplishment).

Industrial Age commanders were, however, aware of the fragility of plans in the face of the harsh and dynamic operating environment of combat. One of the most famous quotations about planning is, “No plan survives first contact with the enemy.” Understanding the limits of military plans, commanders (particularly in highly professional forces) encouraged initiative (innovation and aggressive actions) and decentralized execution within the overall commander’s intent. This was not just a concession to the inherent difficulty of foreseeing all eventualities. It was also a reflection of the fact that the commander on the scene often had better information than those removed from the battlespace.

Taken together, they create a pattern analogous to control theory. The Industrial Age principles and practices of decomposition, specialization, hierarchy, optimization, and deconfliction, combined with Industrial Age command and control based on centralized planning and decentralized execution, will not permit an organization to bring all of its information (and expertise) or its

assets to bear. In addition, Industrial Age organizations are not optimized for interoperability or agility. Thus, solutions based upon Industrial Age assumptions and practices will break down and fail in the Information Age. This will happen no matter how well intentioned, hardworking, or dedicated the leadership and the force are.

Two key force capabilities needed by Information Age militaries are *interoperability* and *agility*. Organizations that are products of Industrial Age thinking are not well suited for significant improvements in interoperability or agility [1].

3. NETWORK CENTRIC WARFARE

Network centric warfare (NCW) is an emerging theory of war in the Information Age. The term network-centric warfare broadly describes the combination of strategies, emerging tactics, techniques, and procedures, and organizations that a fully or even a partially networked force can employ to create a decisive war fighting advantage.

A networked force conducting network centric operations (NCO) is an essential enabler for the conduct of effects based operations. Effects based operations (EBO) are “sets of actions directed at shaping the behavior of friends, neutrals, and foes in peace, crisis, and war.”

NCW generates increased combat power by networking sensors, decision makers, and shooters to achieve shared awareness, increased speed of command, high tempo of operations, greater lethality,

increased survivability, and a degree of self-synchronization. In essence, it translates information advantage into combat power by effectively linking friendly forces within the battlespace, providing a much improved shared awareness of the situation, enabling more rapid and effective decision making at all levels of military operations, and thereby allowing for increased speed of execution.

Information technology advances in the areas of command and control (C2); intelligence, surveillance, and reconnaissance (ISR); and precision weapons delivery are dramatically reshaping the conduct of warfare in the 21st century. NCW will accelerate the decision cycle by linking sensors, communications networks, and weapons systems via an interconnected grid, thereby enhancing our ability to achieve information and decision superiority over an adversary during the conduct of military operations. While NCW is the theory, network centric operations (NCO) is the theory put into action. In other words, the conduct of NCO represents the implementation of NCW.

The objective of decision superiority is to turn an information advantage into a competitive advantage. This competitive advantage is readily apparent when comparing forces conducting NCO and those operating under the old paradigm of platform centric operations. Platform centric forces lack the ability to leverage the synergies created through a networked force. A force implementing NCW is more adaptive, ready to respond to uncertainty in the very dynamic

environment of the future at all levels of warfare and across the range of military operations.

Over thousands of years of recorded history, the vast majority of innovations that created significant war fighting advantages were concentrated in the physical domain as opposed to the information domain. These innovations translated primarily into advantages at the tactical level of warfare, but they also had an impact on what are now generally referred to as the operational and strategic levels of warfare. They resulted in such battlefield advantages as: increased range of engagement, increased lethality, increased speed of maneuver and increased protection and survivability.

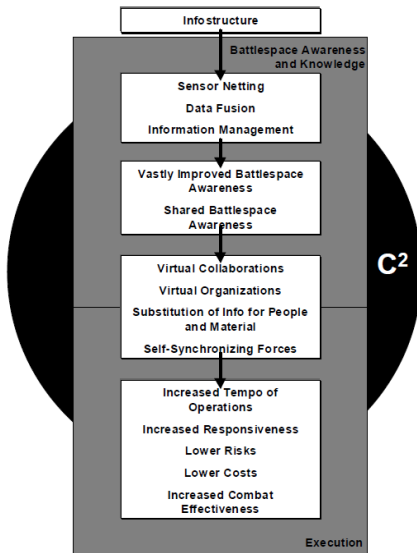


Fig. 1 The Military as a Network-Centric Enterprise

In a more technical sense, a networked force improves operational tempo by accelerating the Observation-Oriented phases of Boyd's Observation-Oriented-

Decision-Action (OODA) loop.

Identified during the 1970s by US Air Force strategist John Boyd, the OODA is an abstraction which describes the sequence of events while must take place in any military engagement. The opponent must be observed to gather information then the attacker must orient himself to the situation or context, then decide and act accordingly. The OODA loop is thus fundamental to all military operations, from strategic down to individual combat. It loop is an inevitable part of reality and has been so since the first tribal wars of 25,000 years ago, as it is fundamental to any predator-prey interaction in the biological world. Sadly, its proper understanding had to wait until the 1970s.

At a philosophical and practical level what confers a key advantage in engagements is the ability to stay ahead of an opponent and dictate the tempo of the engagement - to maintain the initiative and keep an opponent off balance. In effect, the attacker forces his opponent into a reactive posture and denies the opponent any opportunity to drive the engagement to an advantage.

The player with the faster OODA loop, all else being equal, will defeat the opponent with the slower OODA loop by blocking or pre-empting any move the opponent with the slower OODA loop attempts to make.

The four components of the OODA loop can be split into three which are associated with processing information, and one which is associated with movement and application of firepower. Observation-Oriented-Decision is

information centric while Action is kinematic or centered in movement, position and firepower. If we aim to accelerate our OODA loops to achieve higher operational tempo than an enemy, we have to accelerate all four components of the loop.

Much of twentieth century war fighting technique and technology dealt with accelerating the kinetic portion of the OODA loop. Mobility, precision and firepower increases were the result of this evolution. There are practical limits as to how far we can push the kinetic aspect of the OODA loop - more destructive weapons produce collateral damage, faster platforms and weapons incur ever increasing costs. Accordingly we have seen evolution slow down in this domain since the 1960s. Many weapons and platforms widely used today were designed in the 1950s may remain in use for decades to come.

Observation-Orientation-Decision are all about gathering information, distributing information, analyzing information, understanding information and deciding how to act upon this information. The faster we can gather, distribute, analyze, understand information, the faster we can decide, and arguably the better we can decide how and when to act in combat. Networking is a mechanism via which the Observation-Orientation phases of the loop can be accelerated, and the Decision phase facilitated [3].

4. CONCLUSION

The warfare in Information Age will be different than warfare in

Industrial Age. In order to achieve a military superiority the military forces should adapt to the new conditions. The simple networking of the present structure of army is not enough. A new structure of army must be creating which should allow exchange of information at a high speed.

At this point the speed of action will have a great impact on the command and control. Command and control can not obey the management function of planning, organizing, staffing, directing and controlling. During the fight the command and control should obey OODA loop.

In fact during the building of force the commander should be a skilled manager but during the fight the commander should apply control theory that deals with the behavior of dynamic systems.

The OODA loop is a simple and efficient model to describe the reality of fight.

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NEUTROSOPHIC SET – A GENERALIZATION OF THE INTUITIONISTIC FUZZY SET

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Abstract: *In this paper one generalizes the intuitionistic fuzzy set (IFS), paraconsistent set, and intuitionistic set to the neutrosophic set (NS). Many examples are presented. Distinctions between NS and IFS are underlined.*

Keywords and Phrases: *Intuitionistic Fuzzy Set, Paraconsistent Set, Intuitionistic Set, Neutrosophic Set, Non-standard Analysis, Philosophy.*
MSC 2000: 03B99, 03E99.

1. INTRODUCTION

One first presents the evolution of sets from fuzzy set to neutrosophic set. Then one introduces the neutrosophic components T, I, F which represent the membership, indeterminacy, and non-membership values respectively, where $]0, 1+[$ is the non-standard unit interval, and thus one defines the neutrosophic set. One gives examples from mathematics, physics, philosophy, and applications of the neutrosophic set. Afterwards, one introduces the neutrosophic set operations (complement, intersection, union, difference, Cartesian product, inclusion, and n-ary relationship), some generalizations and comments on them, and finally the distinctions between the neutrosophic set and the intuitionistic fuzzy set.

2. SHORT HISTORY

The *fuzzy set* (FS) was introduced by L. Zadeh in 1965, where each element had a degree of membership.

The *intuitionistic fuzzy set* (IFS) on a universe X was introduced by K. Atanassov in 1983 as a generalization of FS, where besides the degree of membership $\mu_A(x) \in [0,1]$ of each element $x \in X$ set A there was considered a degree of non-membership $\nu_A(x) \in [0,1]$, but such that

$$\forall x \in X, \mu_A(x) + \nu_A(x) \leq 1 \quad (2.1)$$

According to Deschrijver & Kerre (2003) the *vague set* defined by Gau and Buehrer (1993) was proven by Bustine & Burillo (1996) to be the same as IFS.

Goguen (1967) defined the *L-fuzzy Set* in X as a mapping $X \rightarrow L$ such that (L^*, \leq_{L^*}) is a complete lattice,

Where

$$L^* = \{ (x_1, x_2) \in [0,1]^2, x_1 + x_2 \leq 1\}$$

and $(x_1, x_2) \leq_{L^*} (y_1, y_2) \Leftrightarrow x_1 \leq y_1$
and $x_2 \geq y_2$.

The *interval-valued fuzzy set* (IVFS) apparently first studied by Sambuc (1975), which were called by Deng (1989) *grey sets*, and IFS are specific kinds of L-fuzzy sets.

According to Cornelis et al. (2003), Gehrke et al. (1996) stated that “Many people believe that assigning an exact number to an expert’s opinion is too restrictive, and the assignment of an interval of values is more realistic”, which is somehow similar with the imprecise probability theory where instead of a crisp probability one has an interval (upper and lower) probabilities as in Walley (1991).

Atanassov (1999) defined the *interval-valued intuitionistic fuzzy set* (IVIFS) on a universe X as an object A such that:

$$L^* = \{ (x_1, x_2) \in [0,1]^2, x_1 + x_2 \leq 1\} \quad (2.2)$$

with $M_A: X \rightarrow \text{Int}([0,1])$ and

$$N_A: X \rightarrow \text{Int}([0,1]) \quad \text{and} \quad (2.3)$$

$$\forall x \in X \sup M_A(x) + \sup N_A(x) \leq 1 \quad (2.4)$$

Belnap (1977) defined a four-valued logic, with truth (T), false (F), unknown (U), and contradiction (C). He used a lattice where the four components were inter-related.

In 1995, starting from philosophy (when I fretted to distinguish between *absolute truth* and *relative truth* or between *absolute falsehood* and *relative falsehood* in logics, and respectively between *absolute membership* and *relative membership*

or *absolute non-membership* and *relative non-membership* in set theory) I began to use the non-standard analysis. Also, inspired from the sport games (winning, defeating, or tight scores), from votes (pro, contra, null/black votes), from positive/negative/zero numbers, from yes/no/NA, from decision making and control theory (making a decision, not making, or hesitating), from accepted/rejected/pending, etc. and guided by the fact that the law of excluded middle did not work any longer in the modern logics, I combined the non-standard analysis with a tri-component logic/set/probability theory and with philosophy (I was excited by paradoxism in science and arts and letters, as well as by paraconsistency and incompleteness in knowledge). How to deal with all of them at once, is it possible to unity them?

I proposed the term “neutrosophic” because “neutrosophic” etymologically comes from “neutrosophy” [French *neutre* < Latin *neuter*, neutral, and Greek *sophia*, skill/wisdom] which means knowledge of neutral thought, and this third/neutral represents the main distinction between “fuzzy” and “intuitionistic fuzzy” logic/set, i.e. the *included middle* component (Lupasco-Nicolescu’s logic in philosophy), i.e. the neutral/indeterminate/unknown part (besides the “truth”/“membership” and “falsehood”/“non-membership” components that both appear in fuzzy logic/set).

See the Proceedings of the

First International Conference on Neutrosophic Logic, The University of New Mexico, Gallup Campus, 1-3 December 2001, at <http://www.gallup.unm.edu/~smarandache/FirstNeutConf.htm>.

3. DEFINITION OF NEUTROSOPHIC SET

Let T, I, F be real standard or non-standard subsets of]0, 1+[,
with

$$\begin{aligned} \sup T &= t_{\sup}, \inf T = t_{\inf}, \\ \sup I &= i_{\sup}, \inf I = i_{\inf}, \\ \sup F &= f_{\sup}, \inf F = f_{\inf}, \end{aligned}$$

and $n_{\sup} = t_{\sup} + i_{\sup} + f_{\sup}$,
 $n_{\inf} = t_{\inf} + i_{\inf} + f_{\inf}$.

T, I, F are called *neutrosophic components*. Let U be a universe of discourse, and M a set included in U. An element x from U is noted with respect to the set M as x(T, I, F) and belongs to M in the following way:

it is t% true in the set, i% indeterminate (unknown if it is) in the set, and f% false, where t varies in T, i varies in I, f varies in F.

4. GENERAL EXAMPLES

Let A, B, and C be three neutrosophic sets.

One can say, by language abuse, that any element neutrosophically belongs to any set, due to the percentages of truth/indeterminacy/falsity involved, which varies between 0 and 1 or even less than 0 or greater than 1.

Thus: x(0.5,0.2,0.3) belongs to A (which means, with a probability

of 50% x is in A, with a probability of 30% x is not in A, and the rest is undecidable); or y(0,0,1) belongs to A (which normally means y is not for sure in A); or z(0,1,0) belongs to A (which means one does know absolutely nothing about z's affiliation with A); here 0.5+0.2+0.3=1; thus A is a NS and an IFS too. More general, y((0.20-0.30), (0.40-0.45)4[0.50-0.51], {0.20, 0.24, 0.28}) belongs to the set B, which means:

- with a probability in between 20-30% y is in B (one cannot find an exact approximation because of various sources used);
- with a probability of 20% or 24% or 28% y is not in B;
- the indeterminacy related to the appurtenance of y to B is in between 40-45% or between 50-51% (limits included);

The subsets representing the appurtenance, indeterminacy, and falsity may overlap, and $n_{\sup} = 0.30+0.51+0.28 > 1$ in this case; then B is a NS but is not an IFS; we can call it *paraconsistent set* (from *paraconsistent logic*, which deals with paraconsistent information). Or, another example, say the element z(0.1, 0.3, 0.4) belongs to the set C, and here 0.1+0.3+0.4<1; then B is a NS but is not an IFS; we can call it *intuitionistic set* (from *intuitionistic logic*, which deals with incomplete information).

Remarkably, in the same NS one can have elements which have paraconsistent information (sum of components >1), others incomplete information (sum of components <

1), others consistent information (in the case when the sum of components = 1), and others interval-valued components (with no restriction on their superior or inferior sums).

5. PHYSICS EXAMPLES

a) For example the Schrödinger's Cat Theory says that the quantum state of a photon can basically be in more than one place in the same time, which translated to the neutrosophic set means that an element (quantum state) belongs and does not belong to a set (one place) in the same time; or an element (quantum state) belongs to two different sets (two different places) in the same time. It is a question of "alternative worlds" theory very well represented by the neutrosophic set theory.

In Schrödinger's Equation on the behavior of electromagnetic waves and "matter waves" in quantum theory, the wave function ψ which describes the superposition of possible states may be simulated by a neutrosophic function, i.e. a function whose values are not unique for each argument from the domain of definition (the vertical line test fails, intersecting the graph in more points).

Don't we better describe, using the attribute "neutrosophic" than "fuzzy" or any others, a quantum particle that neither exists nor non-exists?

b) How to describe a particle ζ in the infinite micro-universe that belongs to two distinct places P_1 and P_2 in

the same time? $\zeta \in P_1$ and $\zeta \notin P_1$ as a true contradiction, or $\zeta \in P_1$ and $\zeta \notin \neg P_1$.

6. PHILOSOPHICAL EXAMPLES

Or, how to calculate the truth-value of Zen (in Japanese) / Chan (in Chinese) doctrine philosophical proposition: the present is eternal and comprises in itself the past and the future?

In Eastern Philosophy the contradictory utterances form the core of the Taoism and Zen/Chan (which emerged from Buddhism and Taoism) doctrines. How to judge the truth-value of a metaphor, or of an ambiguous statement, or of a social phenomenon which is positive from a standpoint and negative from another standpoint? There are many ways to construct them, in terms of the practical problem we need to simulate or approach. Below there are mentioned the easiest ones:

7. APPLICATION

A cloud is a neutrosophic set, because its borders are ambiguous, and each element (water drop) belongs with a neutrosophic probability to the set (e.g. there are a kind of separated water drops, around a compact mass of water drops, that we don't know how to consider them: in or out of the cloud).

Also, we are not sure where the cloud ends nor where it begins,

neither if some elements are or are not in the set. That's why the percent of indeterminacy is required and the neutrosophic probability (using subsets - not numbers - as components) should be used for better modeling: it is a more organic, smooth, and especially accurate estimation. Indeterminacy is the zone of ignorance of a proposition's value, between truth and falsehood.

8. OPERATIONS WITH CLASSICAL SETS

We need to present these set operations in order to be able to introduce the neutrosophic connectors.

Let S1 and S2 be two (unidimensional) real standard or non-standard subsets included in the non-standard interval]0, ∞) then one defines:

8.1 Addition of classical Sets:

$$S_1 \oplus S_2 = \{x \mid x = s_1 + s_2, \text{ where } s_1 \in S_1 \text{ and } s_2 \in S_2\},$$

with

$$\inf S_1 \oplus S_2 = \inf S_1 + \inf S_2, \\ \sup S_1 \oplus S_2 = \sup S_1 + \sup S_2;$$

and, as some particular cases, we have

$$\{a\} \oplus S_2 = \{x \mid x = a + s_2, \text{ where } s_2 \in S_2\},$$

with

$$\inf \{a\} \oplus S_2 = a + \inf S_2, \\ \sup \{a\} \oplus S_2 = a + \sup S_2.$$

8.2 Subtraction of classical Sets:

$$S_1 \ominus S_2 = \{x \mid x = s_1 - s_2, \text{ where } s_1 \in S_1 \text{ and } s_2 \in S_2\}.$$

with

$$\inf S_1 \ominus S_2 = \inf S_1 - \sup S_2, \\ \sup S_1 \ominus S_2 = \sup S_1 - \inf S_2;$$

and, as some particular cases, we have

$$\{a\} \ominus S_2 = \{x \mid x = a - s_2, \text{ where } s_2 \in S_2\},$$

with

$$\inf \{a\} \ominus S_2 = a - \sup S_2, \\ \sup \{a\} \ominus S_2 = a - \inf S_2;$$

also

$$\{1^+\} \ominus S_2 = \{x \mid x = 1^+ - s_2, \text{ where } s_2 \in S_2\},$$

with

$$\inf \{1^+\} \ominus S_2 = 1^+ - \sup S_2, \\ \sup \{1^+\} \ominus S_2 = 100 - \inf S_2.$$

8.3 Multiplication of classical Sets:

$$S_1 \otimes S_2 = \{x \mid x = s_1 \cdot s_2, \text{ where } s_1 \in S_1 \text{ and } s_2 \in S_2\}.$$

with

$$\inf \{a\} \otimes S_2 = a \cdot \inf S_2, \\ \sup \{a\} \otimes S_2 = a \cdot \sup S_2;$$

also

$$\{1^+\} \otimes S_2 = \{x \mid x = 1 \cdot s_2, \text{ where } s_2 \in S_2\}$$

with

$$\inf \{1^+\} \otimes S_2 = 1^+ \cdot \inf S_2 \\ \sup \{1^+\} \otimes S_2 = 1^+ \cdot \sup S_2.$$

8.4 Division of a classical Set by a Number:

Let $k \in \mathfrak{R}^*$,

then

$$S_1 \oslash k = \{x \mid x = s_1 / k, \text{ where } s_1 \in S_1\}.$$

9. NEUTROSOPHIC SET OPERATIONS

One notes, with respect to the sets A and B over the universe U,

$$x = x(T_1, I_1, F_1) \in A \text{ and}$$

$$x = x(T_2, I_2, F_2) \in B,$$

by mentioning x 's *neutrosophic membership, indeterminacy, and non-membership* respectively *appurtenance*.

And, similarly, $y = y(T', I', F') \in B$.

If, after calculations, in the below operations one obtains values < 0 or > 1 , then one replaces them with -0 or 1^+ respectively.

9.1. Complement of A:

$$\text{If } x(T_1, I_1, F_1) \in A,$$

then

$$x(\{1^+\} \ominus T_1, \{1^+\} \ominus I_1, \{1^+\} \ominus F_1) \in C(A).$$

9.2. Intersection:

$$\text{If } x(T_1, I_1, F_1) \in A,$$

$$x(T_2, I_2, F_2) \in B,$$

then

$$x(T_1 \otimes T_2, I_1 \otimes I_2, F_1 \otimes F_2) \in A \cap B.$$

9.3. Union:

$$\text{If } x(T_1, I_1, F_1) \in A,$$

$$x(T_2, I_2, F_2) \in B,$$

then

$$x(T_1 \oplus T_2 \ominus T_1 \otimes T_2, I_1 \oplus I_2 \ominus I_1 \otimes I_2, F_1 \oplus F_2 \ominus F_1 \otimes F_2) \in A \cup B.$$

9.4. Difference:

$$\text{If } x(T_1, I_1, F_1) \in A,$$

$$x(T_2, I_2, F_2) \in B,$$

then

$$x(T_1 \ominus T_1 \otimes T_2, I_1 \ominus I_1 \otimes I_2, F_1 \ominus F_1 \otimes F_2) \in A \setminus B,$$

because $A \setminus B = A \cap C(B)$.

9.5. Cartesian Product:

$$\text{If } x(T_1, I_1, F_1) \in A,$$

$$y(T', I', F') \in B,$$

then

$$(x(T_1, I_1, F_1), y(T', I', F')) \in A \times B.$$

9.6. M is a subset of N:

$$\text{If } x(T_1, I_1, F_1) \in M \Rightarrow x(T_2, I_2, F_2) \in N,$$

where

$$\inf T_1 \leq \inf T_2, \sup T_1 \leq \sup T_2,$$

and

$$\inf F_1 \geq \inf F_2, \sup F_1 \geq \sup F_2.$$

9.7. Neutrosophic n-ary Relation:

Let A_1, A_2, \dots, A_n be arbitrary non-empty sets. A Neutrosophic n-ary Relation R on $A_1 \times A_2 \times \dots \times A_n$ is defined as a subset of the Cartesian product $A_1 \times A_2 \times \dots \times A_n$, such that for each ordered n-tuple (x_1, x_2, \dots, x_n) (T, I, F) , T represents the degree of validity, I the degree of indeterminacy, and F the degree of non-validity respectively of the relation R .

It is related to the definitions for the *Intuitionistic Fuzzy Relation* independently given by Atanassov (1984, 1989), Toader Buhaescu (1989), Darinka Stoyanova (1993), Humberto Bustince Sola and P. Burillo Lopez (1992-1995).

10. GENERALIZATIONS AND COMMENTS

From the intuitionistic logic, paraconsistent logic, dialetheism, faillibilism, paradoxes, pseudoparadoxes, and tautologies we transfer the "adjectives" to the sets, i.e. to intuitionistic set (set

incompletely known), paraconsistent set, dialetheist set, faillibilist set (each element has a percentage of indeterminacy), paradoxist set (an element may belong and may not belong in the same time to the set), pseudoparadoxist set, and tautologic set respectively.

Hence, the neutrosophic set generalizes:

- the *intuitionistic set*, which supports incomplete set theories (for $0 < n < 1$ and $i = 0, 0 \leq t, f \leq 1$) and incomplete known elements belonging to a set;
 - the *fuzzy set* (for $n = 1$ and $i = 0$, and $0 \leq t, f \leq 1$);
 - the *intuitionistic fuzzy set* (for $t+i+f=1$ and $0 \leq i < 1$);
 - the *classical set* (for $n = 1$ and $i = 0$, with t, f either 0 or 1);
 - the *paraconsistent set* (for $n > 1$ and $i = 0$, with both $t, f < 1$);
- there is at least one element $x(T,I,F)$ of a paraconsistent set M which belongs at the same time to M and to its complement set $C(M)$;
- the *faillibilist set* ($i > 0$);
 - the *dialethist set*, which says that the intersection of some disjoint sets is not empty (for $t = f = 1$ and $i = 0$; some paradoxist sets can be denoted this way too); every element $x(T,I,F)$ of a dialethist set M belongs at the same time to M and to its complement set $C(M)$;
 - the *paradoxist set*, each element has a part of indeterminacy if it is or not in the set ($i > 1$);
 - the *pseudoparadoxist set* ($0 < i < 1$, $t + f > 1$);
 - the *tautological set* ($i < 0$).

Compared with all other types

of sets, in the neutrosophic set each element has three components which are subsets (not numbers as in fuzzy set) and considers a subset, similarly to intuitionistic fuzzy set, of “indeterminacy” - due to unexpected parameters hidden in some sets, and let the superior limits of the components to even boil *over 1* (overflowed) and the inferior limits of the components to even freeze *under 0* (underdried).

For example: an element in some tautological sets may have $t > 1$, called “overincluded”. Similarly, an element in a set may be “overindeterminate” (for $i > 1$, in some paradoxist sets), “overexcluded” (for $f > 1$, in some unconditionally false appurtenances); or “undertrue” (for $t < 0$, in some unconditionally false appurtenances), “underindeterminate” (for $i < 0$, in some unconditionally true or false appurtenances), “underfalse” (for $f < 0$, in some unconditionally true appurtenances).

This is because we should make a distinction between unconditionally true ($t > 1$, and $f < 0$ or $i < 0$) and conditionally true appurtenances ($t \leq 1$, and $f \leq 1$ or $i \leq 1$).

In a *rough set* RS , an element on its boundary-line cannot be classified neither as a member of RS nor of its complement with certainty.

In the neutrosophic set a such element may be characterized by $x(T, I, F)$, with corresponding set-values for $T, I, F \subseteq]0, 1+[$.

Compared to *Belnap's quadruplet logic*, NS and NL do not use restrictions among the components – and that's why the NS/NL have a

more general form, while the middle component in NS and NL (the indeterminacy) can be split in more subcomponents if necessarily in various applications.

11. DIFFERENCES BETWEEN NEUTROSOPHIC SET (NS) AND INTUITIONISTIC FUZZY SET (IFS)

a) Neutrosophic Set can distinguish between *absolute membership* (i.e. membership in all possible worlds; we have extended Leibniz's absolute truth to absolute membership) and *relative membership* (membership in at least one world but not in all), because NS (absolute membership element) = 1^+ while NS (relative membership element) = 1. This has application in philosophy (see the neutrosophy).

That's why the unitary standard interval $[0, 1]$ used in IFS has been extended to the unitary non-standard interval $]0, 1^+[$ in NS.

Similar distinctions for *absolute or relative non-membership*, and *absolute or relative indeterminate* are allowed in NS.

b) In NS there is no restriction on T, I, F other than they are subsets of $]0, 1^+[$, thus: $0 \leq \inf T + \inf I + \inf F \leq \sup T + \sup I + \sup F \leq 3^+$.

The inequalities (2.1) and (2.4) of IFS are relaxed in NS.

This non-restriction allows paraconsistent, dialetheist, and incomplete information to be characterized in NS {i.e. the sum of all three components if they are

defined as points, or sum of superior limits of all three components if they are defined as subsets can be >1 (for paraconsistent information coming from different sources), or <1 for incomplete information}, while that information can not be described in IFS because in IFS the components T (membership), I (indeterminacy), F (non-membership) are restricted either to $t+i+f=1$ or to $t^2 + f^2 \leq 1$, if T, I, F are all reduced to the points t, i, f respectively, or to $\sup T + \sup I + \sup F = 1$ if T, I, F are subsets of $[0, 1]$.

Of course, there are cases when paraconsistent and incomplete informations can be normalized to 1, but this procedure is not always suitable.

c) Relation (2.3) from interval-valued intuitionistic fuzzy set is relaxed in NS, i.e. the intervals do not necessarily belong to $\text{Int}[0,1]$ but to $]0, 1^+[$, even more general to $]0, 1^+[$.

d) In NS the components T, I, F can also be *non-standard* subsets included in the unitary nonstandard interval $]0, 1^+[$, not only *standard* subsets included in the unitary standard interval $[0, 1]$ as in IFS.

e) NS, like dialetheism, can describe paradoxist elements, $\text{NS}(\text{paradoxist element}) = (1, I, 1)$, while IFL can not describe a paradox because the sum of components should be 1 in IFS.

f) The connectors in IFS are defined with respect to T and F, i.e. membership and nonmembership only (hence the Indeterminacy is what's left from 1), while in NS they can be defined with respect to any of

them (no restriction).

g) Component “I”, indeterminacy, can be split into more subcomponents in order to better catch the vague information we work with, and such, for example, one can get more accurate answers to the *Question-Answering Systems* initiated by Zadeh (2003). {In Belnap’s four-valued logic (1977) indeterminacy is split into Uncertainty (U) and Contradiction (C), but they were interrelated.}

h) NS has a better and clear name “neutrosophic” (which means the neutral part: i.e. neither true/membership nor false/nonmembership), while IFS’s name “intuitionistic” produces confusion with Intuitionistic Logic, which is something different.

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MONITORING AND CONTROLLING AUTOMATION SYSTEMS USING SMARTPHONES / PDA

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***Abstract:** Many people will be able to leave their laptop at the office and handle essentially all of their mobile computing and communications tasks with a pocket-sized device. Now, the smartphone might not be one's first choice for spreadsheets and documents, but let's face it, everybody has one (in business, anyway, all over the world), and those that have one will buy a new one sometime in the next two years as cellular contracts expire and products and wireless technologies continue their rapid evolution. Smartphones have been as powerful as PCs for just a few years, with significantly better software, user interfaces, and flexibility. The level of capability in contemporary smartphones is remarkable and continues to grow.*

***Keywords:** Smartphone, PDA, automation, monitoring, wireless, LabView, security*

1. OVERVIEW

The growth of wireless communication in the past few years means you can stay connected to a network regardless of whether you are in your neighborhood coffee shop or across the country. No longer bound by the harnesses of wired networks, you can access and share information on a global scale. PDA devices and other mobile handheld devices make it easier than ever to develop remote applications that transmit and receive information from a remote site back to a host computer [2].

LabVIEW (short for Laboratory Virtual Instrumentation Engineering

Workbench) is a platform and development environment for a visual programming language from National Instruments. Originally released for the Apple Macintosh in 1986, LabVIEW is commonly used for data acquisition, instrument control, and industrial automation on a variety of platforms including Microsoft Windows, various flavors of UNIX, Linux, and Mac OS X. The latest version of LabVIEW is version LabVIEW 2009, released in August 2009 [3].

LabVIEW supports the Open System Interconnection (OSI) Model, so implementing wireless network communication in LabVIEW is very similar to implementing wired

network communication.

LabVIEW programs – VIs (Virtual Instruments) can communicate, or network, with other processes, including those that run on other applications or on remote computers to perform the following tasks:

- Share live data with other VIs running on a network using shared variables.
- Publish front panel images and VI documentation on the Web.
- Email data from VIs.
- Build VIs that communicate with other applications and VIs through low-level protocols, such as TCP, UDP, Apple events, and PPC Toolbox.

2. LabVIEW AS A NETWORK CLIENT AND SERVER

You can use LabVIEW as a client to subscribe to data and use features in other applications or as a server to make LabVIEW features available to other applications.

Before you can access the properties and invoke methods of another application, you must establish the network protocol you use to access the properties and methods. Protocols you can use include HTTP and TCP/IP. The protocol you select depends on the application. For example, the HTTP protocol is ideal for publishing on the Web, but you cannot use the HTTP protocol to build a VI that listens for data that another VI creates. To do that, use the TCP protocol. LabVIEW supports several low-level protocols

you can use to communicate between computers [4].

You can use ActiveX technology with LabVIEW as an ActiveX server or client.

Shared variables are configured software items that can send data between VIs. Use shared variables to share data among VIs or between locations in an application that cannot be connected with wires. A shared variable can represent a value or an I/O point. You can change the properties of a shared variable without having to edit the block diagram of the VIs that use the shared variable.

Network-published shared variables communicate between VIs, remote computers, and hardware through the Shared Variable Engine. The Shared Variable Engine uses the NI Publish-Subscribe Protocol (NI-PSP) data transfer protocol to write and allow users to read live data. NI-PSP is a proprietary technology that provides fast and reliable data transmission for large and small applications and is installed as a service on the computer when you install LabVIEW.

The NI-PSP networking protocol uses psp URLs to transmit data across the network. You can browse to any NI-PSP data item on the network to seamlessly bind shared variables to other shared variables or to server and device data items.

An NI-PSP data item can be a shared variable in a LabVIEW project other than an active project or a data item on a connected server or device, such as an OPC server or FieldPoint

module.

3. CREATING SHARED VARIABLES USING LabVIEW PDA MODULE

Use shared variables to share data among VIs in the same PDA or Touch Panel application or to read data from and write data to other network-published shared variables. The shared variables provide a memory space that can be used to send and receive data between different targets in the project. One target in the project must host the shared variables. All other targets can connect to that host as clients to publish or subscribe to the data stored in the shared variable memory space.

The *Project Explorer* window provides the framework for organizing and interacting with various distributed targets from a single location within the LabVIEW programming environment. Shared variables provide an easy method for sharing data between various targets.

A shared variable is accessible through a network, but hosted on a single machine. When developing your VI in LabVIEW, the shared variable library is automatically deployed to the target it is listed under in the project explorer. When the library is deployed to this target, that target is now “hosting” the shared variables contained in the library. Other computers will have to connect to this target to read or write the shared variable library.

The PDA Module do not support

the DataSocket Transport Protocol (DSTP) or hosting of network-published shared variables, which means you only can read and write to targets other than PDA targets.

To create a shared variable that runs on a PDA or Touch Panel target, right-click the target in the Project Explorer window and select *New»Variable* from the shortcut menu to open the Shared Variable Properties dialog box. After you configure the shared variable and click the **OK** button, LabVIEW creates a project library that contains the shared variable under the PDA or Touch Panel target.

After you create the shared variable, you can right-click the variable and select *Properties* from the shortcut menu to display the *Shared Variable Properties* dialog box. Use the *Shared Variable Properties* dialog box to configure the shared variable. The shared variable can be used to read and write shared variable values on the block diagram.

With the network-published shared variables hosted on the development PC in the project, you can use these shared variables to send and receive data between all of the targets in the project. The next step is to create applications that run on the host PC and the PDA target that publishes and subscribes to these shared variables.

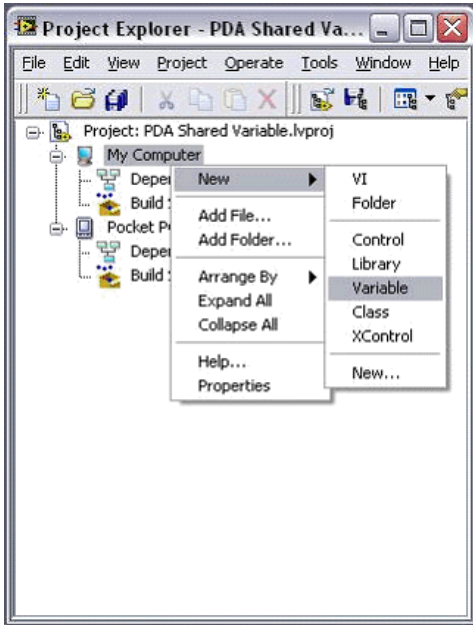


Fig. 1. Creating a new shared variable in the Project Explorer window

Wireless PDA applications consist of a client and a service. The client is the PDA application that monitors or controls remote services over the network and communicates directly with a service on a server or another device. Services are VIs or other applications that perform tasks that the client accesses. For example, a service might be a VI that monitors temperature or tank level. The client might be an application on a PDA target that uses the TCP Open Connection function to connect to a remote service on the network and then uses the TCP Read function to read the temperature or tank level data that the remote service broadcasts over TCP [5].

Note that the PDA device must have an active connection to the

Ethernet or wireless network to subscribe to the network-published shared variables hosted on the host PC.

4. WIRELESS SECURITY IN PDA MONITORING AND CONTROLLING APPLICATIONS

NI Wi-Fi data acquisition (DAQ) devices use IEEE 802.11 to stream continuous waveform data over a wireless network. Because IEEE 802.11 uses over-the-air RF signals as its physical transmission medium, it offers unique security challenges beyond those of a wired system [6].

NI Wi-Fi DAQ supports the highest commercially available security, IEEE 802.11i (commonly known as WPA2 Enterprise).

For effective protection of wireless data transmissions, a Wi-Fi network must have a strong encryption algorithm (cipher) and some form of key management. Two encryption standards are widely used today with Wi-Fi networks: TKIP and AES.

The IEEE 802.11i task group introduced the Temporal Key Integrity Protocol (TKIP) with WPA as a stop gap for existing WEP networks. One advantage of TKIP over WEP is that it uses a 128-bit key versus a 40-bit key, though the encryption algorithm (RC4) is still the same. The more significant difference is that TKIP uses a different key for every message packet, hence the name "temporal." This key is

created dynamically by mixing a known pairwise transient key (PTK) with the MAC address of the client and a serial number for each packet. The PTK is created when a client connects to an access point using a preshared key (a passphrase that is known to all network members) and a random number generator. The serial number is incremented each time a new packet is sent. This means that replay attacks are impossible because the same key is never used from one packet to the next. An access point can detect when an attacker attempts to replay old packets.

As a final security solution, the IEEE 802.11i task group chose the Advanced Encryption Standard (AES) as the preferred encryption algorithm for Wi-Fi networks. AES uses a 128-bit cipher that is significantly more difficult to crack than the RC4 algorithm used by TKIP and WEP. In fact, the National Institute of Standards and Technology (NIST) chose AES as the encryption standard recommended for all U.S. government agencies. Any wireless data acquisition application for the government or military likely has to use AES to transmit data.

Authentication is the second key component of wireless security. Network authentication is essentially client access control. Before a client can communicate with a wireless access point, it must authenticate with the network. There are two basic forms of authentication: server-based and preshared key (PSK)-based.

A successful authentication

process results in a pairwise master key (PMK) used to encrypt wireless traffic. The details of this exchange depend on which Extensible Authentication Protocol (EAP) method the network supports.

NI Wi-Fi DAQ devices support the full IEEE 802.11i security standard, including AES encryption and IEEE 802.1X authentication. This is the highest commercially available wireless network security, meaning your sensitive data is protected from unwanted access.



Fig. 2. NI Wi-Fi DAQ streams continuous waveform data over a secure IEEE 802.11 network.

Security settings for NI Wi-Fi DAQ devices are easy to use. In Measurement & Automation Explorer (MAX), select your NI Wi-Fi DAQ device under “NI-DAQmx Devices” and click on the “Network” tab at the bottom of the screen. Select the “Wireless” tab to configure your network security options with a series of drop-down menus.

If your EAP method requires a client-side certificate, be sure to obtain it before attempting to set

up your data acquisition device. And if you are setting up your own network without an authentication server, be sure to use a strong PSK passphrase (with both WPA and WPA2 networks).

5. CONCLUSION

The LabVIEW PDA Module provides a set of tools to facilitate the implementation of security for local or network resources such as LabVIEW project libraries, shared variables, and front panel objects. Project libraries can be used as containers to assign permissions to multiple shared variables or other project libraries contained in that project library. Although shared variables inherit permissions from the project library where they reside, shared variables can assign individual permissions as well.

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AN OVERVIEW OF SEARCHING AND DISCOVERING WEB BASED INFORMATION RESOURCES

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Abstract: *The Internet becomes for most of us a daily used instrument, for professional or personal reasons. We even do not remember the times when a computer and a broadband connection were luxury items. More and more people are relying on the complicated web network to find the needed information*

This paper presents an overview of Internet search related issues, upon search engines and describes the parties and the basic mechanism that is embedded in a search for web based information resources. Also presents ways to increase the efficiency of web searches, through a better understanding of what search engines ignore at websites content.

Keywords: *information resources, search engines, spiders, web pages, information system.*

1. INTRODUCTION

The Internet becomes for most of us a daily used instrument, for professional or personal reasons. We even do not remember the times when a computer and a broadband connection were luxury items. More and more people are relying on the complicated web network to find the needed information. But how do we find that information? Like as we search a local database using specialized software tools, the Internet search is done in almost the same manner. Let's consider the Internet without search, with no means to navigate. As a result, the web as we know does not exist. We introduced so far two notions: the Internet and Search engines.

We can define the Internet as “a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks of local to global scope that are linked by a broad array of electronic and optical networking technologies” [1].

Another definition that is close to our goals states that “the Internet is an electronic communications network that connects computer networks and organizational computer facilities around the world” [2]. Finally, a third definition states: “a global computer network providing a variety of information and communication facilities, consisting of interconnected

networks using standardized communication protocols” [3].

A search engine is “a program that searches for and identifies items in a database that correspond to keywords or characters specified by the user, used especially for finding particular sites on the Internet” [3]. Another definition said that it is “a program that searches documents for specified keywords and returns a list of the documents where the keywords were found” [4].

Even if in reality search engines is a general class of programs, the term is often used to specifically describe systems like Google, AltaVista or Yahoo search that enable users to search for documents on the World Wide Web.

Why is searching the Web necessary? The answer is that the Internet is too large and chaotic to find much useful information. The initial web architecture was designed for the purpose of simply interconnect pieces of information. The term hyperlink means that the searcher could only find information manually, moving from one piece of information to another by following hyperlinks connecting one page to another.

Search engines aggregate, concentrate and organize information, following a huge number of hyperlinks and collecting information for later retrieval. Since no statistics are recently available, we have to rely on Google’s 2005 announcement that their search engine surpassed 8 billion indexed items (“*Searching 8.168.684.336 Web pages*” [5]) or on Yahoo’s response that “... it had the largest search-engine index, tracking 19,2 billion documents” [5], but the only reasonable way to make an accurate and independent count of the index sizes is to find an objective

noninvolved third party.

The search for web based information resources involves three parties:

- a) the searcher (person and it’s computer)
- b) one or many search engines, and
- c) the web site searched.

It also requires extensive use of the Internet infrastructure and protocols in order that the three parties to communicate. It would be interesting to present a simplified network configuration necessary for connecting to and searching the Internet (figure 1).

The searcher’s computer connects to the Internet through an Internet service provider (ISP) that usually offers the address resolution service using a domain name system (DNS) server. The DNS server is necessary to translate site names (such as *www.dresmara.ro*) typed by the users in browser into the corresponding IP addresses used by Internet routers.

In order to receive the search engine’s home page, a searcher must complete the following steps:

1. The searcher enters *www.search.com* in browser’s address field.
2. The browser sends the request to DNS server (154.69.87.23) to translate *www.search.com* into an IP address.
3. The DNS server responds to browser with 167.89.12.34 address.
4. The browser requests that 167.89.12.34 send its default page (usually *index.htm*).
5. *www.search.com* responds to browser with the search engine’s default page.
6. Browser displays search engine’s default page; searcher can now enter query, sending a search request that would repeat the process again.

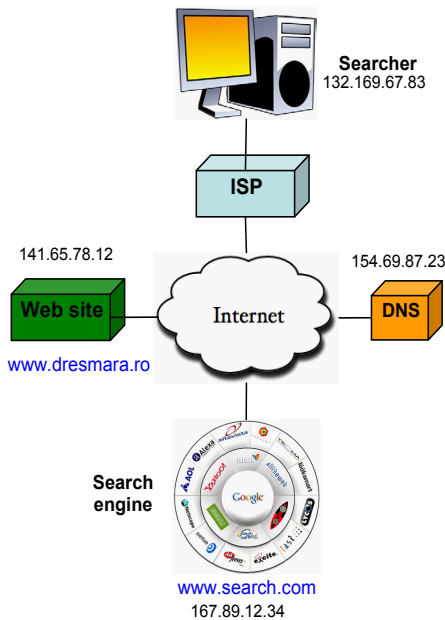


Figure 1. A simplified network configuration.

The mechanism of the process repeats identically for receiving the www.dresmara.ro home page.

2. SEARCH ENGINES

The primary purpose of the search engine is to close the information gap between the searcher and Web site pages. From a searcher point of view, a search engine purpose is to match the query words with words on Web pages and to list the pages containing the matching words in a relevant order.

In the typical search engine architecture, one search engine component called a spider (or crawler, robot, etc.) visits the Web site to retrieve pages linked from the main page just like a person using a browser would follow links to new pages. The crawler follows links, indexing meaningful words of the retrieved pages to be stored along

with the page's Web site location in a specialized database on the search engine for later searches and retrievals [6].

As the searcher sends queries to the search engine, the engine consults the database for pages containing similar words and phrases. After ranking the pages for relevancy to the query, the engine returns the ranked list of Web site page locations. The searcher selects location entries from the list and retrieves pages directly from the Web site.

The accuracy and speed of page ranking calculating process improve the relevance and quality of the web based information resources.

A key point of competition between search engines is the way to rank one document against thousands of others. In reality, an identical search on multiple search engines will produce different results. Based on the search engine's „brand” the searchers chose one search engine.

In order to obtain best results, it is recommendable to consult several search engines to have confidence in the results. Meta-search engines aggregate the results and automate the process searching on multiple sites, by sending the user search query to several search engines and creating a fusion of the results.

3. WHAT SEARCH ENGINES SEARCH AND WHAT THEY IGNORE

In our days web design purpose is not only to create a good looking website, but also to create an “appealing” one for the visitors. Websites compete against each other for a high page rank that means a better position in the page that result after a query.

We often hear rumors about search

engines selling placement at the top, or companies buying high-ranked websites, because high placement in the ranking means money to the commercial Web site. That leads to several reasons to question regarding the accuracy and veracity of the ranking results.

Generally, search engines tend to improve themselves by extracting added information from web pages elements, such as:

- the title
- description
- key word HTML tags
- the meta keywords tag
- the text content section and
- the connecting links to and from the pages.

Most indexing spiders examine only the first few hundred words of content so it is important to early provide descriptive key words in the content text.

Knowing the parts of a web page that attract the attention of indexing crawlers is critical to website designers in their attempt to raise the visibility of their site. Because guidelines to website promotion were extensively published and analyzed, a website designer could proceed in a semi legal manner to “fool” the visiting spiders to index the pages and finally high rank their website.

Examples of manipulation could include web pages that contain:

1. Deceptive text
2. Intentionally misleading links
3. Deceptive self linking referencing patterns among others in a group
4. Off-topic or excessive keywords
5. Duplicate content
6. Different content than the spidered pages
7. Material designed to lead users to other web pages
8. Metadata that do not accurately describe the content of the web

page.

A study of search success [7] illustrates the difficulties and necessity of designing a Web site designed for search. After watching 30 searchers search different sites for content that was on the sites, the study concluded, “we observed that users only found their target content 34% of the time with one search”.

In order to increase the efficiency of our searches, we must understand what search engines ignore at a website.

Most spiders purposely ignore or cannot see large parts of a page that human readers might see and use, effectively hiding that part from search engines.

Every page designer expects the spider to index the full page and follow all links to other pages, but this is not happening all the time. By ignorance or bad design, spiders can be excluded from indexing some or all pages of a web site.

Here are some examples of what the search engines might ignore:

a) *Frames*

Can stop an indexing spider, because frames require at least three separate pages:

- a hidden frameset page that defines the frames and links visible pages into the frames,
- a second page for visible content, and
- a third page for navigation.

A spider usually arrives at the hidden frameset page, but in order to follow links to the other visible pages it must understand how to handle the frames.

Spiders that do not understand frames simply stop and never index further. For those spiders and browsers that do not understand frames, the remaining site pages are unreachable unless alternative links

exist.

b) HTTPS protocol

Spiders generally use only HTTP for communications with web servers and do not normally index a server requiring HTTPS.

c) Scripts

Most spiders ignore script programs written in JavaScript or other scripting languages, others simply index the script program text.

The reasons for spiders ignore scripts are: 1. they must be able to execute the script, which requires an interpreter for the script language; 2. spiders must simulate any required human interactions such as button clicks.

As a result, scripts can hide sensitive information, which sometimes can be good.

d) Java applets and plug-ins

Any browser-executed program is invisible for a spider since no text is provided, other than that needed to execute the program. Unless the spider is able to execute the program, there is nothing to index, and often if executed by the spider, the program output is most likely graphical and unreadable by the spider.

e) Server-generated pages

Some searches may ignore unusual link references that do not end in "HTM" or "HTML." For example, a spider will follow the link "" but may not follow the link to the web server program of "". If generating the main website page in this manner could result that some spiders completely ignore the site.

f) Forms

Some sites offer to visitors the possibility to fill out forms, in order to collect relevant information, such as feedback on different functions, impressions or comments regarding

the content, etc. To complete a form the interaction must be among a human person and the form itself.

Spiders don't know how to fill out forms, and the result for the indexing and search function is the appearance of potential problems generated by leading visitors from a search engine directly to a form page.

g) Spider exclusion

To exclude spiders from indexing certain pages site administrators could use the unique (for the entire site) "robots.txt" file that lists acceptable and unacceptable directories, pages, and spiders.

Another solution is the usage of special meta-tags to specify how the spiders should index each individual page: index the page or not, or the page links should be followed or not.

Depending of the spider's purpose, these "rules" could be (or not) followed. For example, an e-mail address harvester will certainly ignore the exclusion instructions.

h) Images

Spiders may index the image location, image title, and alternate text but that is probably all due to the effort required to analyze an image.

i) Meta-tags

Most spiders ignore Meta tags due to several attempts to manipulate the sites rank. A common past approach was to include in the Meta tags a repeating keyword, over and over. As a result the site was artificially high ranked. A study [8] made in 2007 revealed that at that date Google didn't check the Meta keywords tags, but Yahoo still did.

j) Deeply linked pages

A common belief said that every page of a website is indexed by search engines. In reality, only small sites are checked completely, while larger ones had only a limited number of pages indexed. In practice,

it's recommendable not to have "deep links" because there is a link depth threshold that spiders do not cross, ignoring pages linked beyond that depth.

4. CONCLUSIONS

So far I described a few issues that must be taken into consideration when trying to search web based information resources.

Search engines could be a significant tool in information resources retrieval, but only when used by knowledgeable users. In this respect, here are some web search related problems that must be overcome:

1. Lack of knowledge on how search engines work;
2. Finding the exact topic: Getting too many hits and narrowing down the search;
3. URLs changing or disappearing or hard to memorize addresses;
4. Lack of awareness of browser features.

In conclusion, search engines are the most used search spots in the Internet because it categorize a large amount of stored data and could provide results even for unusual search requests. Knowing some insides of them could improve the quality of our searches, the resulting information and not ultimately our informed decisions.

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FUNDAMENTAL PRINCIPLES OF THE CROSSING (PASSING) CAPACITY FOR WHEEL SPECIAL MILITARY VEHICLES

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***Abstract:** In mountain corps, the combat surprise of the enemy is made, first of all, by mobility. For this, when the horses are not used, the access of vehicles in difficult access areas is sometimes vital because it is a surprise for the enemy, the attacks of special troops of mountaineers can be surprising or the mountain artillery companies can supply their troops better.*

This is the reason why my doctoral research has focused on the influences of ground features on the capacity of crossing, especially in the cold period of the year, because most of the time mountain rangers' corps take action in this kind of conditions.

The tests were made in real conditions, during the missions and the field exercises, in tough climatic and atmospheric conditions, exclusively in mountains in winter.

***Keywords:** mobility, stability, crossing capacity, precessional transmission, wheeling characteristic.*

1. THE PASSING CAPACITY OF WHEEL VEHICLES

The passing capacity is the possibility of vehicles to circulate off-road and on bad or bumpy roads and to pass different kinds of obstacles.

The highest requirements are for off-road vehicles (cars and trucks). The passing capacity is characteristic of military heavy vehicles, which, apart from the possibility of moving on the unpaving or bumpy roads,

have to be capable to circulate into natural ground, in any meteorological conditions and to be capable to pass some obstacles like unevenness, grooves, fords, snow-drifts etc.

The passing capacity, the basic factor that influences the stability of mountaineers' vehicles, depends on some dynamically and geometrical characteristics and it is influenced by the projection solutions that were adopted for global organization and by the constructive solutions of some parts of vehicle. The stability is not only reliability, but also a practical

applying and tactical operative assembly of measures and studies which guarantee the success of the intervention. Briefly, the increasing of the stability of off-road vehicles is the main idea of the paper and the stability is seen not only as fighting stability, but also as global stability.

2. THE INFLUENCE OF THE CONSTRUCTIVE SOLUTIONS ON THE PASSING CAPACITY OF THE VEHICLE

Some constructive and dimensional particularities were solved logical during projection, so, the tendency is to increase the passing capacity according to the requirements and the destination of the vehicle. Some of the most important solutions will pointed out here, in this paper because I have noticed them during mountaineers' field exercises.

The increasing of the number of tires and their position. The moving capacity on bumpy roads and on soft ground is improved if the tire pressure on the ground is low. This is done by increasing the number of tires and their size or by using more than two axles. The solution of disposing the wheels one by one (in tandem) is more favorable than the solution of the two twin wheels on the same part of the axle; the rolling resistance decreases because of the lesser width of wheel track and the adherence of the rear tires increases because they pass on the trace left by the front wheels. That is why it is advisable the

width of the front track to be the same with the width of the rear track.

The use of independent wheel suspension. It is necessary that the road normal reactions for drive wheels, in case of moving into soft or uneven ground, to vary as little as possible in order to use a drive force as much as possible because their increase could make the wheel to dip and to skid on the ground. So, the independent wheel suspension has to be used.

The use of drive front axle. Sometimes, in off-road conditions, the military vehicles with a large crossing capacity meet perfect vertical obstacles (balustrades, slopes etc.). The crossing capacity depends on the type of the drive wheels because the vehicle must have front drive wheels or the temporary possibility to connect them, the rest of the time the front wheels being used only for steering and suspension systems.

Favorable construction solutions adopted for the transmission parts. The possibilities of moving in soft ground are increased by hydrodynamic transmission because the drive force is smoothly applied to the wheels. In this case, the slippage of the tires is eliminated. This is one of the reasons why the hydrodynamic transmissions are used for military vehicles.

3. THE OPTIMIZING OF THE TRANSMISSION SYSTEM BY USING PRECESSIONAL TRANSMISSION [3]

A way of developing transmissions is the drawing up of new types of mechanical drive lines. The harmonic transmission has appeared this way.

Cinematically and constructively speaking, the harmonic transmission has many tangent points with the planetary transmission. It is one of its modifications. The flexibility of one of the pinions is the main difference.

The harmonic transmission is compact, has high lifting capacity and assures high cinematic precision and the possibility of sending power into watertight medium – the basic advantage of harmonic transmission.

The disadvantages are: low reliability of the flexible element (and low reliability of transmission in general), reduced capacity to work on high speed and some technological difficulties.

These disadvantages do not occur in case of the precessional planetary transmission. This was known before the harmonic transmission but it was not used too much because of the inadequate using of internal evolventic gear. This gear does not take into consideration the influence of the particularities of the spherically-spatial movement of satellites to the transmission function.

The increased multiplicity of precessional transmission (till 100% teeth pairs in gear simultaneously) provides a high lifting capacity and

a cinematic accuracy and moreover low overall size and mass. Other advantages could be: large cinematic possibilities, high efficiency, low acoustic emission, the possibility of sending the movement into watertight medium and the possibility of solving all technological problems.

In conclusion that is why the precessional transmission has large possibilities to be used in mechanical engineering.

Depending on the structural scheme, the precessional transmissions are two basic types: K-H-V and 2K-H. Starting from these two basic types, a large range of constructive solutions with large cinematic and functional possibilities can be drawn up. They could have the possibility to work as reduction or multiplicity gear, differential, auto break system etc.

The gear-train diagram of precessional transmission K-H-V (look to the figure 1 a) consist of four elements: planet carrier H , satellite wheel g , central wheel b and body.

The satellite wheel g and the central wheel b are into internal gear and their teeth generating lines cross each other in one point; this point is named center of precession.

The satellite wheel g is placed on the planet carrier H which is built like an inclined crank. Its central axle together with the axle of central wheel forms an angle θ . The inclined crank H , because of its rotation, send to satellite wheel a , a spherically-spatial movement as against the ball joint from the center of precession.

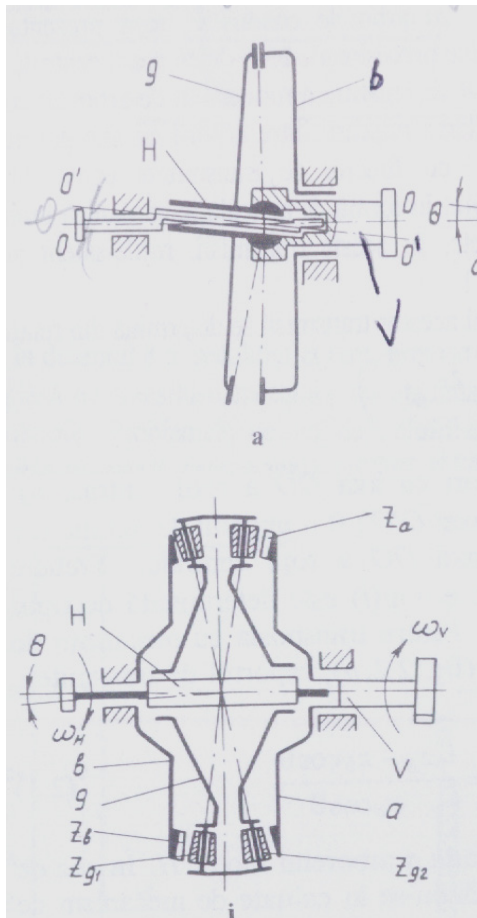


Fig. 1 The precessional transmissions

The precessional transmission 2K-H (fig 1i) has higher performances mainly in cinematic plan. It consists of the satellite wheel g , with two crown gears Z_{g1} and Z_{g2} , which are in gearing with two central wheels: one is mobile a and the other one is immobile b .

Both types of precessional transmissions have not been used in automotive industry yet, but, considering their performances, they can be successfully applied for differentials, gear boxes, reduction boxes, drive wheels, particularly for

“off-road” vehicles.

Implications of changing the classical drive lines (planetary or/ and rigid axis mechanisms) with precessional transmissions.

Straight implications:

The global mass of transmission (vehicle) decreases $\rightarrow m \downarrow$; If it is necessary the conversion ratio of power unit could increase $\rightarrow i \uparrow$;

Compact transmission that bring about increasing of protection level;

The transmission efficiency increases $\rightarrow \eta_{tr} \uparrow$; The possibility to use precessional transmission as drive wheels, differentials and high watertight gear and reduction boxes.

Indirect implications:

The wheel torque increases because:

$$M_r = M_e \cdot i_t \cdot \eta_t;$$

The wheel tangential force increases because: $F_r = M_r/r$;

The traction force increases because:

$$F_t = \frac{M_e \cdot i_t \cdot \eta_t}{r} \quad (3.1)$$

The general dynamic of vehicle increases because of mass decreasing;

It is easier for the vehicle to be used on the stable area of traction (adherence) characteristic mainly for the most difficult moments, starting and low speeding moments, because driveline connection is done without jerking (it is a feature of the precessional transmission), so, without high sliding; this thing is very difficult or impossible to be done by classical transmission.

4. EXPERIMENTAL RESEARCHES TO ESTABLISH THE CROSSING CAPACITY OF MILITARY VEHICLES

The necessity of obtaining of an as good as possible stability of military vehicles for fulfilling the combat missions at optimal parameters implies the optimization of tire-road interaction. The process is more complex in off-road conditions as it usually happens in mountain areas.

This is the reason why my doctoral researches has focused on the influences of ground features on the capacity of crossing, especially in the cold period of the year, because most of the time mountain corps takes action in this kind of conditions. Also, wooden growth has the a lot of importance, because it can block the access of vehicles in some areas, many times the military fighting against the actions of external agents because of the low protection level of some components of the body of vehicles.

The tests were made in real conditions, during the missions and the exercises field, in tough climatic and atmospheric conditions, exclusively in mountains in winter. The results were very interesting, because by using them we can improve the capacity of crossing of military vehicles that were checked: DAC 665 T, DAC 887 R and R 16215 FA. The geometrical parameters, the functional parameters of the capstan and the static pressure of the tyres of testing trucks were established. It

was noticed that the dates obtained by measuring the specific pressure on the ground, for the front right tire of the testing trucks, are at the low limit for the values established for the trucks. This is good for military vehicles because they are used mainly "off-road". The aim of these preliminary researches was to establish if the trucks, after an intensive exploitation, observe the initial working parameters.

In the second part of the test, the limit crossing capacity for snow pack was established. We noticed an important difference between the results obtained on light (fresh) snow at low temperatures ($-20^{\circ}\text{C} \leftrightarrow -5^{\circ}\text{C}$) – the first situation – and the results obtained on wet snow with temperatures around 0°C – the second situation. The wet snow has the characteristic to create tracks easily. In an extreme situation, this can cause the blocking of the wheel in the holes which are created, especially when the tire does not have a ground adapted profile (tractor profile). The wet snow has a higher resistance to advancement. So, the driver has to be very careful not to hasten the wheel, because, if this happens, the wheel could get stuck.

Because, during missions and field exercises, camps have to be installed in wild places with abundant underwood, the studies have to be focused on the possibilities of vehicles to pass through these types of areas, mainly for body down level. Because there are not any estimated perfect methods of access

possibilities through underwood wild areas, we have to draw up new methods to estimate the passing capacity for forest exploitation and military interventions, but also to go deep into the existing methods taking into account, as an original item, the level of protection of the military vehicles subassemblies. If the tanks and armored personal carriers, from other reasons, NBC protection and the necessities of floatability and tightness, had a good level of protection, the military trucks, mainly the ones used by Mountain Corps, are neglected, in many cases unwanted events taking place and causing their immobilization from minor reasons which could have been avoided by using very simple methods.

The justification of the practical necessity to elaborate a calculation procedure of the protection level for vehicle subassemblies when passing through woods or through a general wild zone: During personal activity as vehicle exploitation and maintenance officer, I encountered many situations, mainly during missions and field exercises, with the relative “fragility” of the exposed parts of the vehicles used during these activities (R 16215 FA, DAC 665 T, and DAC 887 R). I refer to the inferior part of the chassis because, in a few situations, some vehicles, very well adapted to the difficult conditions in leaf-bearing forests but also in coniferous woods from the mountain areas where the mountaineers work, became suddenly non-operating or it was impossible to force them.

The method used was that of taking minute photos of vehicles, insisting upon the “delicate” parts. The components already protected (headlights with protection grid, the radiator with a special shield, etc) and the ones which, by constructive solidity, could support, when necessary, the weight of the vehicle (springs, axles, gear boxes, switchgear distributing boxes ...) were not taken into account. We insisted upon plastic and rubber components and the wiring of the electrical equipment.

We studied almost the whole car park and we noticed the most numerous deteriorations which could be the result of the described situations.

The classical method of drawing up the felling coefficient

➤ This method refers only to the capacity of vehicles in general to pass through wild areas, but it does not offer us some details about the protection level of subassemblies situated in an exposed position of the vehicle body.

➤ There have been arranged three underwood routes :

I zone: maximum thickness for the most of undergrowth: 95 mm;

II zone: maximum thickness for the most of undergrowth: 70 mm;

III zone: maximum thickness for the most of undergrowth: 50 mm.

➤ The formula for felling coefficient: $m = d_c / G_t$, where:

G_t – full load of testing vehicle [t];

D_c – maximum thickness of the most of undergrowth from testing zone [cm].

Testing Conditions

Table 1

Preparation of vehicles	Fuel and oil full load, indicated tire pressure
Load conditions	The testing will be made in three situations: body weight, partial load and full load
Testing place	Babarunca-Grohotis zone
Temperature	Aprox. 12°C
The minimum length of arranged route	Aprox. 3,5-4 length of trucks
Underwood density	Aprox. 45 pieces/m ²
The distribution in percents of underwood thickness	10% maximum thickness 25% medium thickness 65% below 30 mm thickness
The vehicle working conditions	The gear box in first speed, reduction gear box on "force" speed, the engine speed at maximum power

Felling Coefficient m for DAC 887 R

Table 2

Load [t]		I zone	II zone	III zone
body weight	13,5	0,70	0,51	0,37
partial load	16	0,59	0,43	0,31
full load	21	0,45	0,33	0,23

Drawing up a formula that can show the protection level of vehicles subassemblies as well as possible [1]

➤ There are some factors that are to be taken into account

when suggesting a formula for the protection level of a vehicle :

- the vulnerable surfaces which need 1,2,3,4 protection level;
- the importance of the necessary protection level;
- the number of 1,2,3,4 level components and the surfaces covered by them;
- the position of unprotected parts: front, behind, lateral and inferior (down level);
- level of self-protection because of constructive solidity;
- if the components could be protected from working position;
- level of self-protection because of the basic material of the components.

The Suggested General Formula

$$K = 100(N_1 \cdot S_1 \cdot \alpha_1 + N_2 \cdot S_2 \cdot \alpha_2 + N_3 \cdot S_3 \cdot \alpha_3 + N_4 \cdot S_4 \cdot \alpha_4) \quad (4.1.)$$

where:

K – exposure level; it shows to what extent the vehicle can be affected by the physical agents of the environment; as we can deduce from the formula , the ideal value of K is 0.
N – the number of subassemblies which need the protection level 1,2,3 or 4.

S – the surface covered by the subassemblies with a certain protection level; it is a part of the total surface where, due to the intervention of the environment against it , the vehicle can be damaged because of the deterioration of one of those elements. We can also use S without the index number in order to indicate the whole exposed surface and then $S = S_1 + S_2 + S_3 + S_4$;

α – the necessary protection level coefficient; it has got a certain value, one found intuitively for every protection level.

The general formula can be used for every exposed surface and that's why we can calculate a global exposure level. The inferior part of the vehicle body is considered the most important one because it includes the most "delicate" components which have a direct influence on the durability of the vehicle. That's why I'm going to introduce the experimental results found when calculating the exposure level regarding the inferior part of the vehicle body for DAC 665 T, R 16215 FA and DAC 887 R. One of the first conclusions is that these vehicles do not function properly regarding the way some components were located (projecting deficiency) and regarding the careless way these components were set and/or taken care of.

In order to apply these theories, we'll introduce the results obtained when calculating the protection level for the vehicles mentioned before. Because the inferior part of the chassis is very important, we will find the exposure levels for this part of the vehicle body.

5. CONCLUSIONS

As we could see, the first part pointed out the importance of basic constructive solutions adopted by off-road vehicles for the increasing of crossing capacity, the way it was shown within my research. In

the second part it was proved the importance of applying of new kinds of mechanical drive lines, as it is the precessional transmission which could improve the adherence between tire and road by increasing driver car handling.

The final conclusion is that a good theoretical understanding of practical phenomenon, which could be met during fields exercise, can be realized by detail analyzing of wheeling (adherence) characteristic.

In short, the necessity of obtaining as good a stability as possible of military vehicles to fulfil the combat missions at optimal parameters implies the optimization of tire-road interaction, seen as a mechanic system.

The process is more complex in off-road conditions as it usually happens in mountain areas because we know that the dynamic performances of vehicles, especially for military vehicles used off-road, are limited by road adherence (grip conditions).

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