



Review

of the Air Force Academy

The Scientific Informative Review No 2(15)/2009

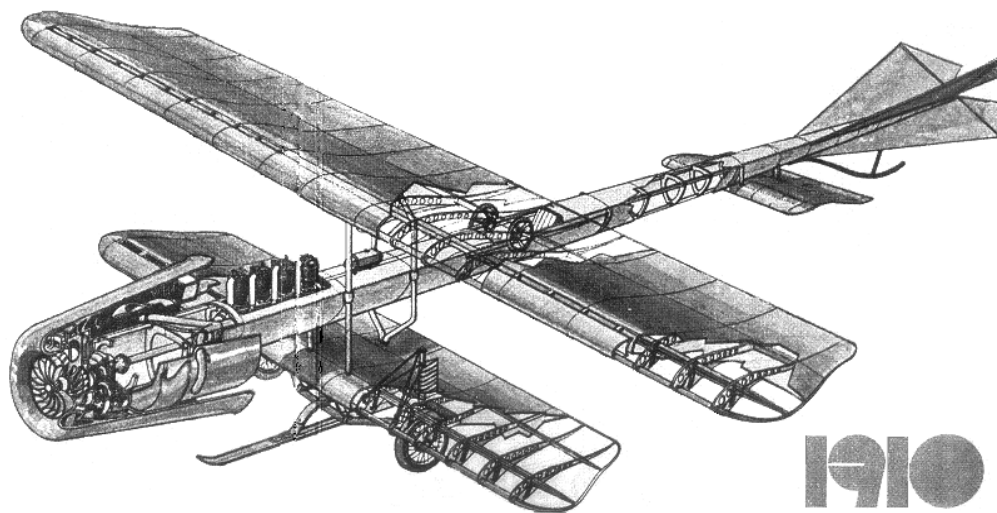


BRAȘOV

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1910

Braşov

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REVIEW OF CONTRIBUTIONS REGARDING COANDA EFFECT

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Abstract: Coanda effect is the phenomena in which a jet flow attaches itself to a nearby surface and remains attached even when the surface curves away from the initial jet direction. In free surroundings, a jet of fluid entrains and mixes with its surroundings as it flows away from a nozzle. When a surface is brought close to the jet, this restricts the entrainment in that region. As flow accelerates to try balance the momentum transfer, a pressure difference across the jet results and the jet is deflected closer to the surface - eventually attaching to it.

Key words: slot, attached jet, static pressure, centrifugation zone, suction zone.

1. INTRODUCTION

The Coandă effect or fluid jet deviations closed to curl surfaces was observed by Henri Coandă (1910) during his first flight powered by jet propulsion (Fig.1).

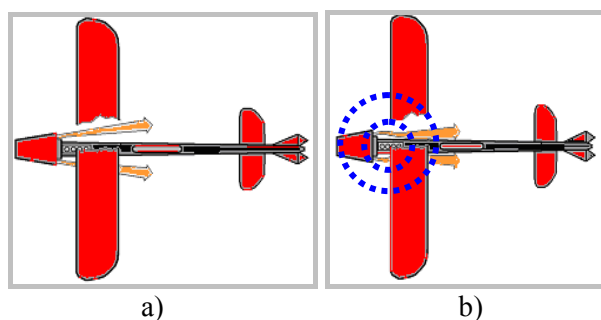


Fig. 1 The geometry of Coanda jets

In author’s description (Coanda, 1969), this effect is “based on the creation of a depressurized zone in the main air stream along a wall, which permits flows to get the wall direction where the pressure difference was triggered”. In fact this is a transformation of a linear jet in a curled jet based on the attachment at a divergent wall. After lengthy research, the engineer obtained the French patent act nr. 792754 of October 8, 1934 and the Romanian one, nr. 24376 of October 4, 1935, entitled *Procedure and device for the deviation of one fluid into another*.

2. THE BASIC ASPECTS OF COANDA EFFECT

The Coandă effect is a natural phenomenon with action on the flow attached to a divergent wall (volet or airfoil) characterized by a high assymetry. It is possible to remark the following aspects (Fig.2):

1. The depressured zone determines:
 - a) *flow acceleration upstream in the slot*, without increasing upstream pressure or temperature;
 - b) *the displacement of the local fluid*.
2. Detaching and re-attaching is characterized by histerezis (the reattaching is produced at smaller angles than the detaching).
3. The global flow that results from the mixing between the main flow and the displaced one is situated in the depressure zone and is characterized by lower temperature.

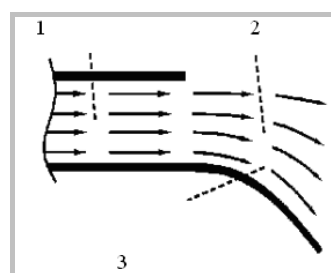


Fig. 2 Coandă flow (2D)

3. AN ANALYSIS OF THE GEOMETRY OF COANDA EJECTORS

For a 2D attached jet type flow there results a first class of Coanda ejectors with

rectangular section (Fig.3), that could function also with limitation wall.

Another type of ejectors is represented by the axial symmetric device (external vs. internal ejectors Fig. 4).

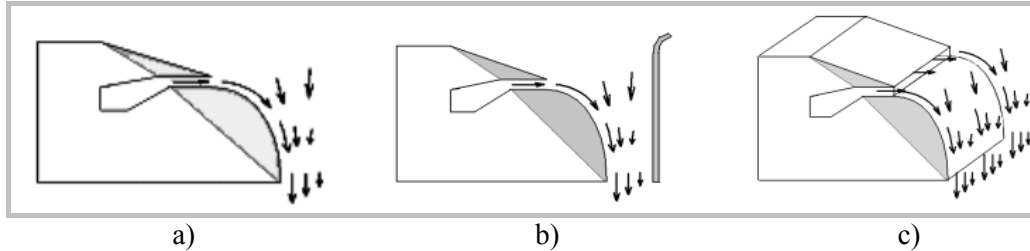


Fig.3. Rectangular (2D) ejectors: a) 2D Coanda flow; b) 2D Ejection device; c) 3D Ejection device with limiting wall

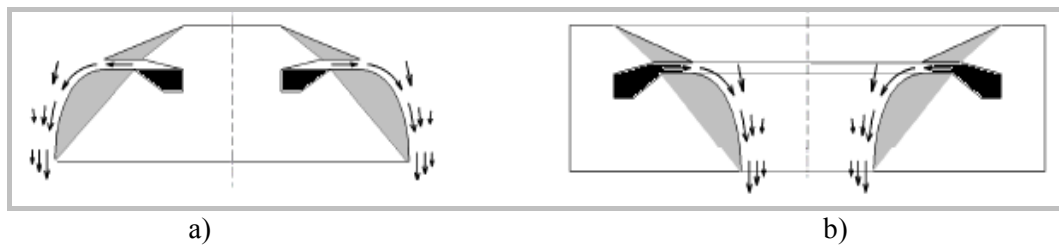


Fig. 4 Ejection device: a) Lenticular external ejection device; b) Lenticular internal ejection device

4. A GLOBAL ANALYSIS OF THE MIXING PROCESS IN THE EJECTION DEVICE

Let consider an ejection device that we are going to analyse from the point of view of the mixture between the primary flows, the active one, through which energy is introduced into the system, and the secondary flow.

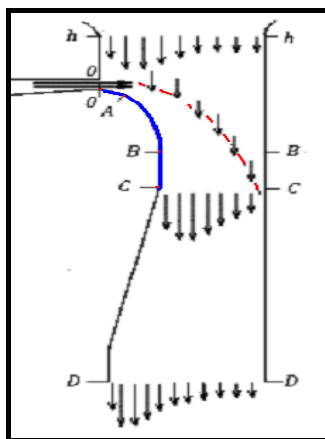


Fig. 5 Coanda ejector with non-uniform speed distribution

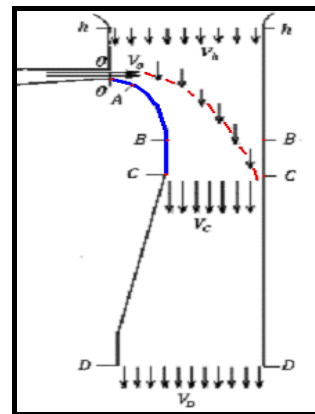


Fig. 6 Coanda ejector with uniform speed distribution

In the inlet (Section 0-0), the primary flow is introduced by compression, acceleration or through absorption directly from the environment. The absorption section (h-h) through which the resulting inflow moves only and is characterized by the fact that the total enthalpy i^* of the flow is the same with that of the environment i_H^* . The place around A is supposed to be the spot where the depressurization flow is maximal. Section B-B

shows the end of the Coanda profile (line OAB). Section C-C is where the absorption section ends and the thickness of the mixing region equals that of the C-C section. D-D is the exit section from the ejection disposal and is characterized through the fact that the static pressure is equal with that of the environment static pressure p_H . The area h-0-C-B-h is considered to be the absorption area where the total enthalpy i^* of the flow is the same as that of the environment i_H^* . Area 0-ABC-C-0 is considered to be that of the mixture where the whole quantity of generated flow is received through the permeable surface C0. Area C-D-D-C is the area of acquiring uniformity for aerothermodynamic parameters in section C-C and it usually has a divergent form, which contributes to the increase of efficiency of the ejection device. Its existence leads to the increase of the generated flow but it does not necessarily mean an increase of the propulsion force. The research on the force increase will have to take into consideration the entire geometry of the ejection device. The known factors are the geometry of the ejection device in its sections (Ah , $A0$, $AB = AC$, AD), the fuel conditions in the slot (p^* , P_0), and environmental conditions (p_H , ρ_H , i_H^*). Also, for this global analysis of the mixture in the ejection device the values of the energetic performance η_C , η_D on sections 00-CC, 00-DD, are considered as known.

In Fig. 7 is presented the distribution of speed in a section of the Coanda ejection device with two different regions, an asymmetrical one (d width), and a uniform one ($D-d$ width) where the length of the boundary layer at the wall being s .

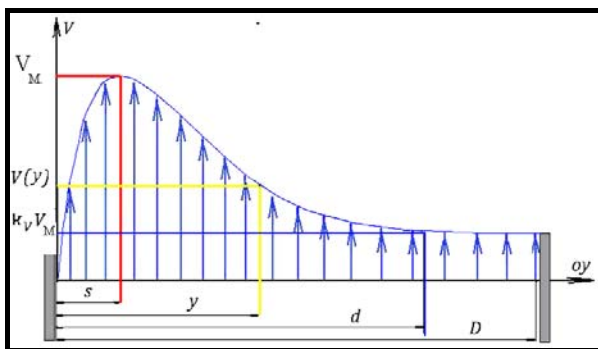


Fig. 7 Distribution of speed in a section

5. CASE STUDY: COANDA EJECTION DEVICE WITH UNEVEN SPEED

Let a Coanda ejector with non-uniform and variable speed distribution. In the D exit section, the static pressure p_D equals the environment pressure p_H . The power transferred to the fluid in D section is:

$$P_0 = \eta P_D = \int_{AD} \rho_H V_D(y) (i_D^* - i_H^*) dA_D$$

$$= \frac{\rho_H V_{MD}^3 A_D \chi_{3D}}{2} \quad (1)$$

The gain force is given by the difference between the two force distributions, with a maximal value corresponding to A:

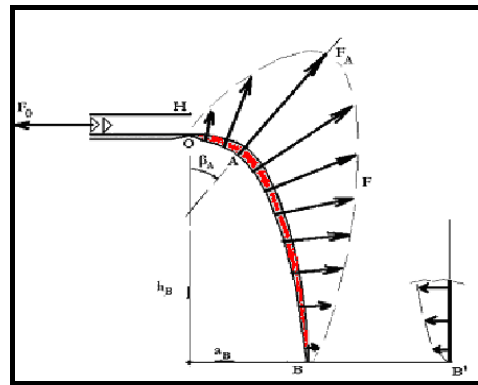


Fig. 8 Force distributions on Coanda airfoil

Let detail Coanda flow by using two zones with special properties, the centrifugation zone and the suction zone.

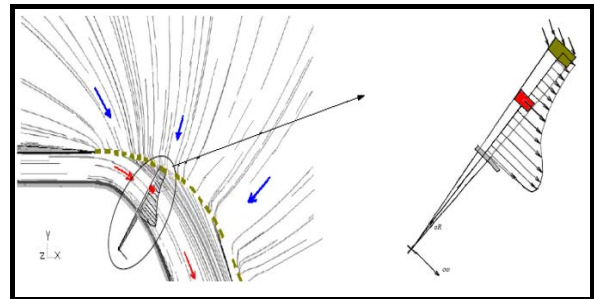


Fig. 9 Detailed analysis of Coanda flow

The equations for the centrifugation zone that is associated to the mixing region 0-ABC-C-0 with C0 permeable are:

$$\frac{1}{r} \cdot \frac{\partial(\rho \cdot u_{\omega})}{\partial \omega} = 0 \quad (2)$$

$$-\frac{u_{\omega}^2}{r} = -\frac{1}{\rho} \frac{\partial p}{\partial r} \quad (3)$$

$$u_{\omega} \frac{\partial u_{\omega}}{\partial \omega} = -\frac{1}{\rho} \frac{\partial p}{\partial \omega} \quad (4)$$

$$i^* = i_H^* \left(\frac{p}{p_H} \right)^{\frac{k-1}{k}} + \frac{u_{\omega}^2}{2} \quad (5)$$

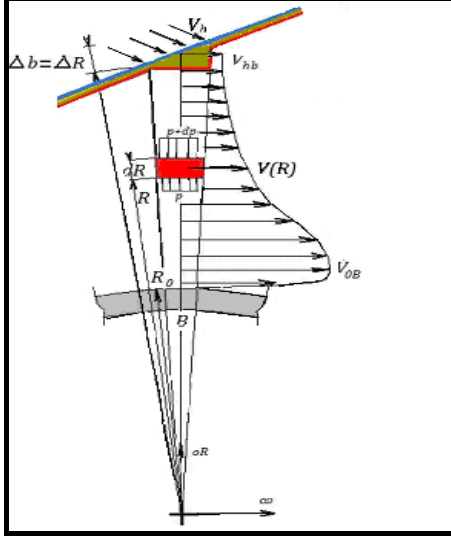


Fig. 10 Element of jet

For a small element of jet flow, the radial movement equation is:

$$\frac{dR}{R} = \frac{dp}{\rho u_{\omega}^2} \quad (6)$$

For B_i on the profile:

$$u_{\omega} = u_{\omega 0} f_u(R) \quad u_{\omega 0} = u_0 f_{u0} \quad (7)$$

and the total enthalpy is conserved:

$$i^*(R) = \frac{[u_{\omega}(R)]^2}{2} + \int \frac{[u_{\omega}(R)]^2}{R} dR \Big|_R + i_c^* \quad (8)$$

The static pressure is expressed by:

$$p(R) = p_H \left(1 + \frac{1}{i_H^*} \int \frac{[u_{\omega}(R)]^2}{R} dR \Big|_R \right)^{\frac{k}{k-1}} \quad (9)$$

and the static density and static temperature are:

$$\rho(R) = \rho_H \left(1 + \frac{1}{i_H^*} \int \frac{[u_{\omega}(R)]^2}{R} dR \Big|_R \right)^{\frac{k}{k-1}} \quad (10)$$

$$T(R) = T_H \left(1 + \frac{1}{i_H^*} \int \frac{[u_{\omega}(R)]^2}{R} dR \Big|_R \right)^{\frac{k}{k-1}} \quad (11)$$

The gain in force at B_i :

$$\phi_{Bi} = b_0 \int_{R1}^{R2} \left(1 + \frac{1}{i_H^*} \int \frac{[u_{\omega}(R)]^2}{R} dR \Big|_R \right)^{\frac{k}{k-1}} \quad (12)$$

$$f_{u0}^2 f_u^2(R) dR$$

and the corresponding efficiency is:

$$\eta_{Bi} = b_0 \int_{R1}^{R2} \left(1 + \frac{1}{i_H^*} \int \frac{[u_{\omega}(R)]^2}{R} dR \Big|_R \right)^{\frac{k}{k-1}} \quad (13)$$

$$f_{u0}^3 f_u^3(R) dR$$

We note that the flow attached is situated in the depression zone defined by the exit from slot, 0-0, B-B section and D-D exit with a maximal value in A.

6. CONCLUSIONS

In the conclusion we can state that for the same energy available P_0 , the D_f force gain can be obtained by decreasing the speed $V_D < V_M$, similarly to an increase by ejection of the mass flow evacuated.

In order to obtain the highest force possible for an available used energy it is preferable to put into motion the highest amount of fluid possible with the lowest speed possible instead of a small amount of fluid put into motion with a high speed.

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POSSIBILITIES OF MODERNIZATION L-159 AIRCRAFT IN THE AIR FORCE OF THE ARMY CZECH REPUBLIC

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Abstract: *Author analyses problems L-159 ALCA aircraft of the Czech Air Force, on the area of flight training in modern airplanes, and the problematics of two-seaters. The conclusion points out the need of a modern flight simulator, that is prepared for manufacturing and is connected with the possibility of selling of this aircraft abroad.*

Keywords: *L-159 ALCA aircraft, L-159 ALCA armament.*

1. INTRODUCTION

In the spring of 2003, the first phase of reconstruction of this airbase into a standard NATO airbase was initiated. This phase is expected to be terminated in 2008. Eight pilots and forty mechanics have been undergoing conversion training for the Swedish-made JAS-39 Gripen aircraft since August and October of 2004. This airplane replaced the MiG-21 in the integrated air defense system NATO – NATINADS on July 1st, 2005.



Fig. 1 L-159 Aircraft with armament

2. L-159 AIRCRAFT AND ARMAMENT

The aircraft does not carry any internal fixed cannon armament. The two-barrel 20mm ZPL-20 Plamen cannon (or the French GIAT)

is mounted under the fuselage. It was not possible to install this air cannon into the fuselage due to lack of space in the airframe. It is a certain disadvantage while firing at aerial targets or at point ground targets, when the fire effectivity is decreased due to increased cone of fire. On the other hand, the fire effectivity is greater while firing at surface ground targets thanks to bigger scatter pattern (and therefore better coverage of the entire surface of the target). For destruction of ground targets, guided and unguided missiles, as well as laser-guided bombs, can be used. Further equipment includes reconnaissance, navigational and gunnery containers for electronic warfare. The AIM-9M (L) Sidewinder short-range missile is used for air-to-air combat. The L-159 ALCA can carry up to 2 340 kg of ordnance or up to four external fuel tanks on six wing pylons and one underfuselage pylon.

The GEC-Marconi Sky Guardian radar warning receiver is used for aircraft's self defence. It is able to detect and evaluate any threat from ground or air. This system is connected to chaff&flare dispensers, which can be deployed in automatic, semi-automatic or manual mode. The records of the warning system are continuously recorded during flight for further analysis and for the purpose of radio-electronic reconnaissance and warfare. Perspectively, the usage of externally carried jammers able to analyze and jam wide spectre

of radars and tracking devices is being thought over.



Fig. 2 L-159 Aircraft and possible equipment variants

To briefly summarize the contribution of L-159 ALCA to our Air Force, it is necessary to mention three essential fields. By fielding of a rightly equipped and fully compatible combat system, the ongoing transformation of Air Force and its conversion to entirely new flight and operational standards was vitally sped. By other words, the Czech Air Force was able to transfer to the NATO standards in quite a short time. In the area of flight training, it was possible the induce an entirely new level of quality, which fully meets the requirements of the modern time, thanks to the L-159.



Fig. 3 Indicator HIS in L-159 aircraft

The flight and ground personnel began to dispose with a proper know-how and to operate contemporary airborne and weapon systems, which were established on modern airplanes with regard to NATO standards. It was possible to begin the training in full conformity with NATO regulations and procedures. One of the major factors was the

increase of combat capabilities of the Czech Air Force. The L-159 aircraft are able to participate in a wide range of aerial operations regardless of daytime or weather conditions. The flight crews can use modern tactical ways of combat activity conduction and perform strikes with a much higher precision. By introduction of L-159, the Czech Air Force gained a great compatibility and ability of a full-value cooperation with other NATO air forces.

The basic armament of L-159 comprises:

- AGM-65B Maverick air-to-ground/anti-tank guided missile with TV guidance;
- PAVEWAY II air-to-ground precisely guided bomb (PAVEWAY III is not used in the Czech Air Force);
- Brimstone anti-tank guided missile;
- AIM-9M (L) Sidewinder air-to-air guided missiles;
- 20mm two-barrel Plamen (GIAT) cannon pod of high rate of fire.

The aircraft can further use:

- CBU-87 cluster bombs;
- Mk-82, Mk-83 conventional aerial bombs;
- CRV-7 unguided missiles launched from LAU-5002 and LAU-5003 rocket blocks.



Fig. 4 The cockpit of L-159 with multifunction displays

In this phase, we can ask a question what the further cooperation between the aircraft manufacturer and Czech Air Force will be. A view to the future of the Air Force is always a complicated prediction based upon various factors. In the case of L-159 program, amount of support from the side of military budget

resources and level of technical support by the manufacturers are the most important factors. These were the causes of signing an agreement between Czech Army and Aero Vodochody regarding after-guaranty servicing and operation support with a certain guarantee for future years. If the L-159 should fully turn profit of its potential, it is necessary to conceptually continue in three essential areas. It is necessary to solve the issue of double-seaters and introduce them into operation.

An essential factor, which is related to the future of the L-159 project will be our corporate ability to export the airplane abroad. In this area, a bigger amount of responsibility lays on the trade policy of the state and on the Aero Vodochody management. The sale support from the side of Czech Army (as a user) remains a critically important act. The sale of unoperated and redundant L-159A aircraft from the Air Force's inventory seems to be a real option in the near horizon. This is subsidized by the close cooperation with E-Com Slavkov company, which has developed an L-159B flight simulator, that was exposed at IDET 2005 international exhibition and that is now ready for manufacturing.



Fig. 5 L-159 Aircraft with armament

As the most perspective seems the conversion of single-seaters into two-seater trainers. Though, this conversion would solve just the contemporary chilling situation at the operational combat unit. Further, the present defined number of four trainer aircraft will not

most likely cover the needs of advanced flight training of tactical air force. It will be necessary to think about a conceptual provision of the advanced flight training of combat pilots after the year 2010. Along with qualitatively growing demands for the level of training of tactical air force pilots as well as for their ability to operate systems and dynamics of fourth generation aircraft, a question of whether our air force possesses a sufficient number of advanced and relevantly powerful trainer aircraft arises. Number of aircraft to cover the needs of a modern advanced flight training in the horizon of at least 15 to 20 years. It is also necessary to mention, that the actual manner of pilot training at the training center in Pardubice is temporary and is perspective just in the horizon of five, maximally ten years, because of the obsolescence of L-39 Albatros aircraft. In this situation, it seems to be very desirable to maintain the ability to conduct development and provision of final deliveries by domestic aviation industry in conformity with the past tradition.

The near future solution could be the acquisition of sufficient number of L-159B trainers for provision of a full-value flight training at the training unit. These aircraft are able to answer the demands of the nearest 25 years thanks to their parameters and features. The second area is the necessary modernization of L-159A combat aircraft. Present technological progress is so dynamic, that the technical and moral lifespan of each system declines dramatically. Already today, it is important to think about the manner and extent of the mid-life upgrade. It is crucial to be concerned with integration of new identification and information devices and data transfer systems.

A further pertinent integration of modern armament (for which the L-159 seems to be an appropriate platform) will increase combat capabilities of the whole complex.

3. CONCLUSIONS

In the conclusion, it is necessary to state, that an entirely new quality of modern combat force, which is respected both domestically and

abroad, has been created thanks to the L-159 combat and training complex. This system has brought a brand new quality and contributed to its transformation into present modern and combat ready forces, respected home and abroad. The complicated and uneasy process of development and fielding of L-159 aircraft greatly contributed to the increase of know-how and technological level of domestic aviation industry. A field, which has not only a magnificent history, but possess sufficient potential to react on the demands of modern air forces on the world level even today. An area, which is thanks to its expert and financial heftiness accessible just to the desirable ones, and which is thanks to L-159 aircraft closely connected to Czech military aviation for many years on.

This mutual dependancy connects the personnel of industry and military. Therefore it is possible to await a close and mutual cooperation on the projects of conversion, modernization, integration, development and integration of both parts and whole units of L-159 combat and training system even now. Such is the Czech Air Force, which has been greatly enriched by the JAS-39 Gripen

supersonic aircraft, that receives (and will receive) a lot of attention on the domestic and international scene.

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PLANNING AND CHECKING THE QUALITY OF MILITARY RADIO STATIONS. FACTORS AFFECTING THE QUALITY OF RADIO STATIONS

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Abstract: The quality control represents an activity which confirms if application of the standards concerning services, materials, processes and manufacturing can prevent to deliver any defective products to customer. An organization must use all practical means to prevent, detect and correct any error that can appears in different stages of production / operation. These errors can be detected either by testing, verifying and control methods either by identifying the factors that influence the quality of radio stations. To have a real control of quality, these factors must be kept under observation as well as the variables that can affect it as a result of people's action, nature of materials or equipment performance.

Keywords: quality, acceptance, testing, reception attempts, control plan.

1. INTRODUCTION

A higher quality is conditioned by the contribution of whole organization in realization of it also by fulfilling of the responsibilities' of the department „in charge” with quality that varies from one organization to another, in relation with some factors such as: size of company, profile, territorial dispersion, abilities of employees and staff, etc.

The quality department tasks derive from quality management functions, being specified in the documents that describe the organizational structure. In Fig. 1 are presented the compartments of the most common structure responsible with quality. According with their job, the responsibilities are the following:

- quality management (engineering) – with tasks regarding the Quality Management System (QMS) documents (developing, updating, disseminating, preserving them and other specific activities);
- quality internal audits – the aim of this activity is planning and coordinating of the internal audits, processing and management of

information regarding QMS and evaluation of it's effectiveness.

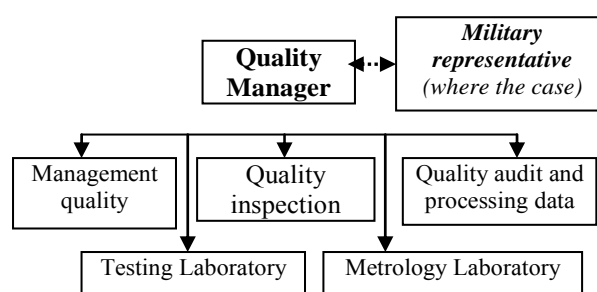


Fig. 1 The Quality Department organizational chart

2. PLANNING ATTEMPTS

The quality control of military radio stations can be achieved based on the Control Plan, provided by the organization's specialized compartment, using statistic methods or other methods that are stated by technical documentation of the product.

The Statistical Control Plans regarding radio stations are developed, for example, according with the data from Tables 1 (Control Plans with Simple Sampling) and 2

(Control Plans with Double Sampling) and it's used for all test groups except the requirement of reliability tests (good operation, in service life cycle and preservation).

An example regarding the way to determine for a lot = 550 radio stations, sample size n = 80 and AQL = 1.0 the acceptance / rejection value (A = 2 / R = 3) is shown in the matrix from Table 3.

In the statistical control, the lot size must be at least twice larger that the size of the sample.

For planning of the *Periodic Type Attempts* and *Reception Attempts*, in the case that acceptance quantity is 0, it is allowed to be

used the *Control Plans* with 8/5 sample size or 3 sample pieces. For radios stations with small production series and/or costly verification that require complex measurements and large volume of work, it is allowed the use a sample size of 5 or 3 pieces conditioned by the beneficiary approval and included in the technical documentation.

Planning of the Periodic Type Attempts

Periodic Type Attempts are scheduled using simple or double sampling plans. The general acceptance number for all attempt groups, carried out with the same periodicity, is established by technical documentation.

Table 1 Control Plans with Simple Sampling

Number of acceptance	Amount of acceptance sample n (pcs) for acceptable quality level AQL (%)										
	0,040	0,065	0,10	0,15	0,25	0,40	0,65	1	1,5	2,3	4
0	315	200	125	80	50	32	20	13	8	5	3
1	-	-	-	315	200	125	80	50	32	20	-
2	-	-	-	-	315	200	125	80	50	32	20

Table 2 Control Plan with Double Sampling

Acceptance number in the first sample - AC1 (pcs)	Acceptance number after the first and second sampling - AC2 (pcs)	Number of sampling	Amount of acceptance sample n (pcs) for acceptable quality level AQL (%)						
			0,65	1	1,5	2,5	4	6,5	10
0	-	n ₁	50	32	20	13	8	5	3
-	1	n ₂	50	32	20	13	8	5	3

Table 3 Matrix of Control Plans with Simple Sampling

Nc = II																							
Simple plans of normal control																							
Lot size (N)	Sample size (n)	Acceptable quality level AQL																					
		0,1		0,15		0,25		0,40		0,65		1,0		1,5		2,5		4,0		6,5		10	
		A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R	A	R
2 - 8	2	↓		↓		↓		↓		↓		↓		↓		↓		0	1		↓		
9 - 15	3	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
16 - 25	5	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
26 - 50	8	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
51 - 90	13	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
91 - 150	20	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
151 - 280	32	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
281 - 500	50	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
501 - 1.200	80	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
1.201 - 3.200	125	↓		↓		↓		↓		↓		↓		↓		↓		0	1	↑	↓		
3.201 - 10.000	200	↑	↓	↑	↓	1	2	2	3	3	4	5	6	7	8	10	11	14	15	21	22	↑	
10.001 - 35.000	315	↓		↓		↓		↓		↓		↓		↓		↓		10	11	14	15	21	22
35.0001 - 150.000	500	1	2	2	3	3	4	5	6	7	8	10	11	14	15	21	22	↑					

The assessed of results analysis is done similar with the *Lot Attempts*.

Planning of Lot and Reception Attempts

Planning can be done by using the *Statistical Control Plan* or the *Full Control Plan*.

In case of activities that includes verification of size and other requirements regarding installation and connection of radio station into the circuit, the characteristics that are critical for the functional destination and detection of errors that has as result losing of working capacity is used the *Control Plan with "Zero Defects"*.

The technical documentation for specific product types defines the list of acceptance test with *zero defects*.

If for some groups *The Statistical Control Plans* establish for acceptance values different than 0, the technical documentation sets up the general (total) acceptance number for the sample under the control test as well as the reception.

In case of the full control each product from the group is checked and the number of acceptance is established by the technical documentation. The acceptance number for any size of verified lot has to be 0 for the critical parameters of functional destination, dimension, installing and connection, features as well as the defects which conduct in losing of working capacity of the product. If some features are not important for the functionality of the products, the number of acceptance may be different by 0, if the beneficiary agreed that.

The results of Statistical Control are considered positive if the number of defective products does not exceed the acceptance number established for test groups and the general acceptance number. The result is considered negative if the number of defective products and removed from the lot is superior either to the acceptance number settled for test groups or the general acceptance number.

The results of Full Control are considered positive if the number of defective products does not exceed the number of acceptance and is considered negative if this number exceed.

For the reception of products, the technical documentation established the range values for

each lot size. The type of Control Plan is properly established according with to value of lot size.

Planning of the Periodic Type Attempts

Periodic Type Attempts are scheduled using simple or double sampling plans. The general acceptance number for all attempt groups that are made with the same periodicity are established by technical documentation.

The assessed of results analysis is done similar with the Lot Attempts principle.

Fault Analysis

Through this activity are developed and introduced in the manufacturing process measures able to eliminate the occurrence of defects. This activity is organized by the manufacturer's Quality Assurance Section with the participation of specialists / structures that are involved in production. The beneficiary's representative can participate in this activity if this one request so.

3. THE QUALITY OF RADIO STATIONS

Using the statistical control for reception of radio stations lots, suppose to develop a Verification Plan which includes data regarding sampling plan, specific rules to be followed for decision of acceptance or rejection of a lot depending on the level of quality.

A Verification Plan can be developed for both methods (attribution / measurement), defining the following: Acceptable Quality Level (AQL); Type of Sampling; the verification level (VL); degree of severity.

a) *The Acceptable Quality Level (AQL)* is stated under the contract closed between supplier and beneficiary. It must be settled according with the type of product and quality features that are controlled.

The defects which may occur at radio station can be classified in different ways. Regarding gravity, the most reliable classification involves two classes: *major defects* and *minor defects*. Also the concept of *critical defects* can be defined and, in this case are three concepts - *minor defects*, *major defects* and *critical defects* [1]:

- Minor defects - defect which is tolerable but it not reduce too much the possibility of using the product for the purpose which has been designated or, according with the specifications presents a little irregularity that affect a little bit using the product or the effective functioning of it.
- Major defects - without being critical, the defect is likely to cause a failure of the product/equipment or to reduce substantially the possibility of using that product for the purpose of which it was designated.
- Critical defect - defect likely to cause the lack of security or risk to injury the users, maintenance personnel or those who depend on that product, or that might hinder the fulfillment of the functions of a final product.

Thus, for the same radio station can be determined two values of AQL: a lower value for major defects and a higher value for minor defects.

In this case, a lot is accepted if it meets both Verification Plans conditions (both AQL values) and is rejected if one or both control plans results are found inadequate.

If products are very important it can be stated subdivisions of the same defect class, giving the AQL values and Verification Plans, separate for each subclass.

b) *The Type of Sampling* is different for each method: simple sampling, double sampling and multiple sampling (Fig. 2).

c) *The verification level (VL)*, together with AQL, determine the quantity of samples to be verified and determine in this way, the degree of consistency of information on the quality of the lot from which the sample was taken. The size of the risk inherent in each plan is highlighted by the operational characteristics shown, for example, in Romanian STAS 3160/2-84 - "The Allocation Method" and Romanian standard SR ISO 3951/1998 - "The Measuring Method". For the levels of verification are established two categories namely:

- Usual levels of verification VL 1, VL 2 and VL 3, are used in verification of the products or features, with normal control time, which where no checked previously. They are used for the wide range of products (eg radio stations components, batteries, common modules, etc.).
- Special inspection levels: S1, S2, S3, the relatively high risks can not be tolerated. They are used to check the radio stations.

d) *The degree of severity*: sets condition for acceptance of lots depending on the stability of supplier manufacturing processes (Fig. 3), also by the results of previous checks. May be: low, normal and severe [2].

Low degree of severity: the quantity of samples and the defective volumes that establishes the level of acceptance or rejection of the lot is lower than normal control.

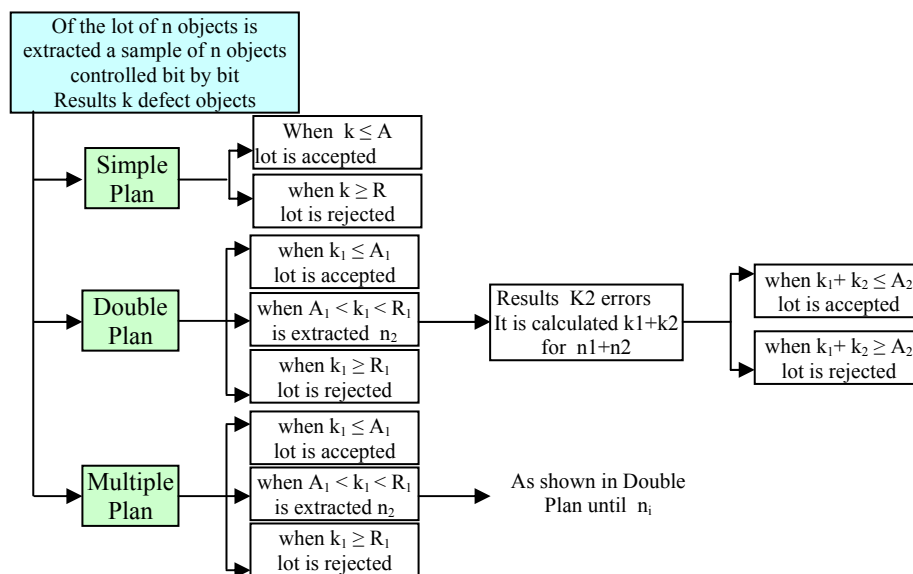


Fig. 2 Control Plans Schedule

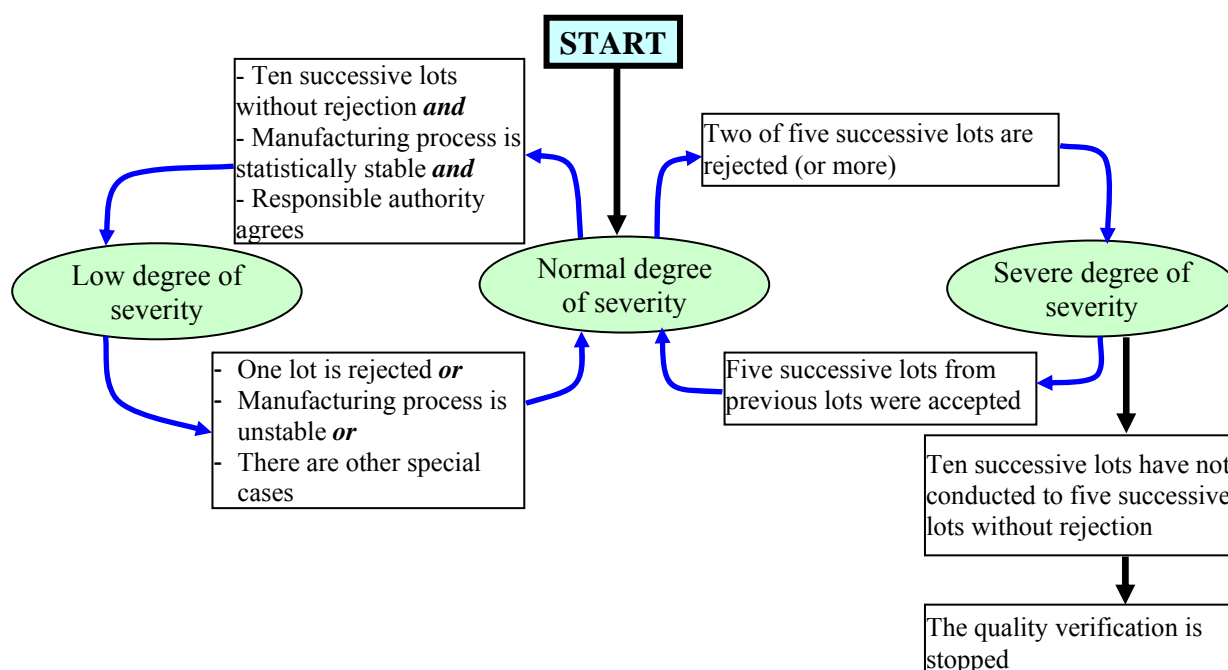


Fig. 3 Rule of increasing the severity degree

Normal degree of severity: is applied to a singular control (verification of random lots) or when an item is checked for the first time.

Severe degree of severity: level is demanding. At the same n samples of a product, the volume of defects accepted is lower than the other procedures for which the lot it is accepted or rejected.

Initially, the control begins with the normal degree of severity. The severity degree is established by the obtained results from previous inspections as well as the results obtained during of ongoing inspection.

4. FACTORS AFFECTING THE QUALITY OF RADIO STATIONS

Quality is a practical concept, complex and dynamic. Its dynamic nature has a perturbing or useful effect regarding quality. The factors that affect the quality of radio stations can be characterized by quality spiral [3] as in Fig. 4.

Also this spiral illustrates the stages that are going through in order to raise up the quality from a lower to a higher level.

Steps that are going through from one level to another are:

- Research – in this step are studied all positive results obtained in the previous

production activities, all results of similar producers and market requirements.

- Comparative studies, establishing of tipo dimensions and specific details. In this case is specified the new look of the product and it's features.

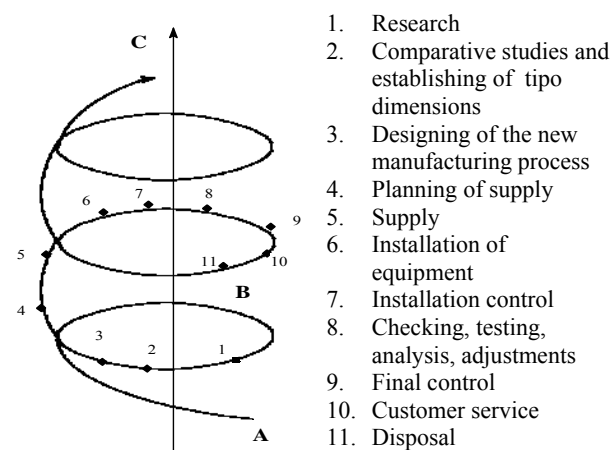


Fig. 4 Quality Spiral

- Designing of the new manufacturing process - the aim is to obtain products with higher level of quality by establishing the technical rules for manufacturing.

- Planning of supply - in this phase is planned the purchase order for equipment / raw material based on suppliers and is established the assembly order.

- Supply - in this stage are purchased the machines from suppliers, with particular attention on condition and quality of machines, equipment and facilities to prevent their degradation.
- Installation of equipment.
- Installation control.
- Checking, testing, analysis, adjustments - tools are tested in this stage and is made the first attempt to obtain the new product (prototype). The prototype is analyzed and according of the results adjustments are made on the tools/machinery.
- Final control - in this stage is controlled the adjusted technological flow of production and is made a statistical analysis in order to identify its normal state.
- Customer service - in this stage are organized all activities regarding carriage, storage and handling in order to obtain an optimal cost of these.
- Disposal - in this stage the high quality product is available for delivery.

5. CONCLUSIONS

- Using the control methods presented above allows the customer to perform a correct reception of products and provides complete information regarding the characteristics of lot.
- Organizing of inspection/control should be based on prevention principle and the early

quality, which provide significant savings by reducing of non-conformities and / or their early detection. Also, by using the methods of testing and verification presented above, can be provided complete conclusions regarding the entire manufacturing process.

- Having in view the results obtained during the manufacturing process and using the verification and control methods, the manufacturer can intervene, in real time, on the production flow for reducing of defects in early stage. In this way, the final product fulfills the requirements from technical specifications with significant savings and high quality.

- The control regard all production processes and it have to be planned. The control methods are chosen and adapted by taking in consideration the particularities of each controlled process.

- By identifying the factors that affect quality of radio stations it can be intervened in the flow of design and production in order to obtain high quality products.

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BRASOV AIRFIELD INTRODUCTION IN TEMPERATURE ANALYSIS

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Abstract: *The particularity of the geographical location of Brasov airfield can mark out meteo-climatic elements and typologies that could help improve the aeronautical forecast. The temperature evolution from the last 38 years emphasized the dropping tendencies of extreme characteristic temperatures for the winter season as well as the increasing temperatures for the summer season in paralel with the pronounced variability of the extreme absolute temperatures and the differences from one month to another regarding the monthly and daily extreme average. This fact maintained the multiannual average temperature at 7.6°C according to the climatological norm. With a number of 325 days of temperatures $\geq 30^{\circ}\text{C}$ registered during the period of study there were distinguished 8 specifical typologies for the medium range of atmosferic circulation. These results could have an essential aport in the prognostic analysis for Brasov airfield.*

Keywords: *climatological norm, atmosferic sounding, absolut topographic baric maps, cyclone, thalweg, anticyclone, dorsal.*

1. INTRODUCTION

The topoclimat of Brasov depression along with the specific atmospheric circulation from medium altitude are the main sources used in the making of a reliable forecast.

Being in tight relations with the heat balance and with the succession of the main baric centers, temperature represents the prime element that stands at the basis of all physical processes. Thus, a climatological analysis regarding temperature evolution has the purpose of understanding the topoclimat of Brasov airfield. Once accustomed with the topoclimat through an aerological analysis concerning the circulation on the medium layers of the atmosphere one can also give explanations regarding the evolution of extreme temperatures, temperatures with a high importance in the aeronautical forecast.

2. CLIMATOLOGICAL ANALYSIS

During the years 1896-1965 the multiannual average temperature for Brasov airfield was 7.6°C [5], value maintained also

for the analysis period, 1971-2008. However, referring to a mountain climate that is permanently situated under the influence of air masses with different thermal characteristics, the variability of the thermal range can point out another image regarding the evolution of the multiannual monthly average temperature or the number of tropical days frequency, to the absolute maximum or minimum temperature registered.

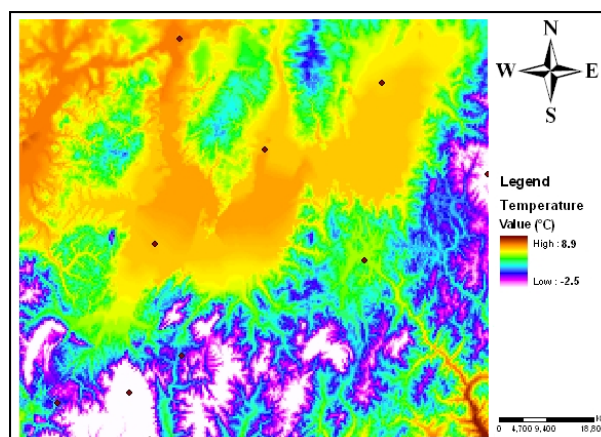


Fig. 1 Brasov Depression – territorial repartition of the multiannual average temperature (1971-2000)

If in the winter months the average multiannual temperature was -3.3°C , as climatological norm, for the study period the temperature raised to -2.9°C , increase given by the positive difference of 1.3°C of the multiannual average temperature for January, from -5.1°C to -3.8°C . Otherwise, the elevated temperatures during winter drove to the rising of the annual medium temperature. A conclusive example is the year 2007 when there was registered the highest average annual temperature of 9°C , monthly means for January and February being positive, in January being registered the highest average in daily temperature, of 7.8°C . The pronounced increase in temperature as well as its decrease, are tightly connected with the specificity of the atmospheric circulation from the season in question. During the 2006-2007 winter there were registered the highest temperatures since the beginning of meteorological observations in Romania (over 100 years), in January being recorded the highest positive deviation (with aprox 6°C), thus becoming the hottest month compared with the normal registered.

Cold air advections and the frequent thermal inversions specific for depressions in the winter season caused a strange variability between the highest and the lowest multiannual monthly average (Fig. 2).

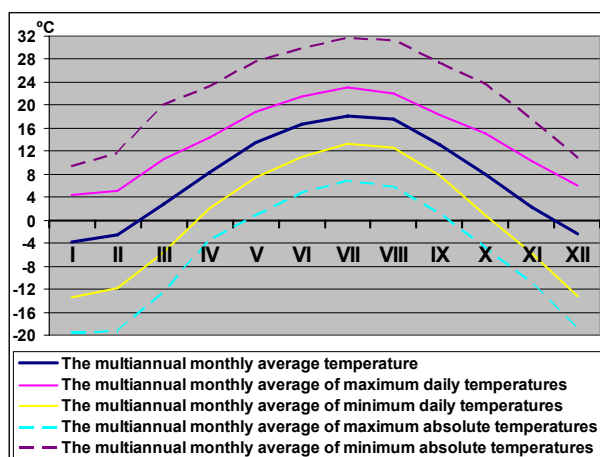


Fig. 2 The variability of the multiannual monthly average temperature

These differences became reduced during the summer season due to the lower contrast between the air masses, from $10.9-12^{\circ}\text{C}$ in the winter season to $4.7- 6.5^{\circ}\text{C}$ in the summer season. The most pronounced difference from 20

one month to another for the multiannual monthly average regarding the daily maximum temperature is between February and March with 5.56°C and for the minimal daily temperature 7.62°C is between months March and April. The smallest differences are found, in both cases, between the months December-January and July-August. The concave shape of the relief delimited by mountain heights determines the formation and the frequency of freezing and of very low minimal temperatures due to the stasis of cold air for long periods. Thus, during the cold season the minimal temperature constantly decreases below 0°C representing 48.4-68.4% of the total number of days characterized by freezing. If until the year 2000 only in the years 1971, 1989 were registered less than 130 freezing days, starting with the year 2001 the frequency has dropped; there were recorded only in 2003 and 2006 a number of over 130 days with the minimal temperature below 0°C (Fig. 3). The same tendency can also be noticed for the days with frosty nights.

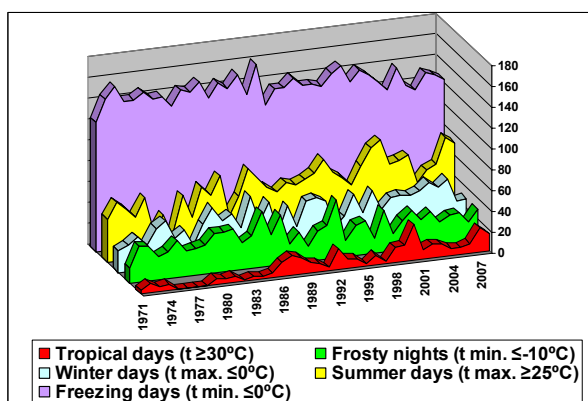


Fig. 3 Evolution of the days with extreme characteristic temperatures

In the first 16 years of analysis there were recorded 10 years with over 30 days that had the minimal temperature below -10°C , while in the next 22 years there were registered only 7 days with frosty nights. The analysis of the pressure gradient for the cold period of the year shows that this evolution was determined by the blocking regime for the 2000-2001, 2002-2003 winter, the zonal flow regime in North of Romania for the winter from 1999-2000, 2001-2002, 2003-2004, 2004-2005 and the anticyclone regime from 2005-2006

winter, 2006-2007, 2007-2008 (The weather regimes for winter seasons are explained by Vautard [8]).

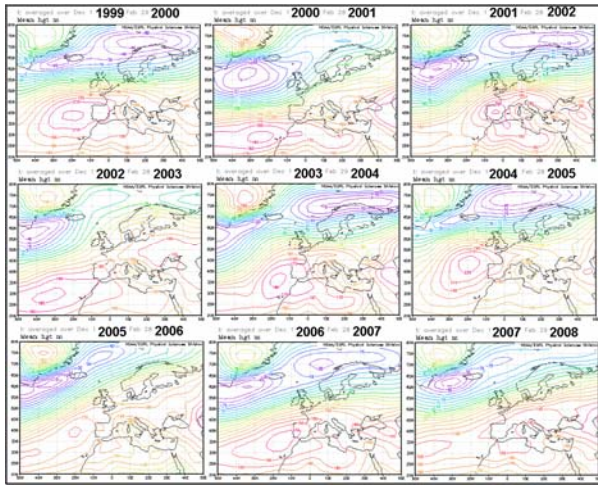


Fig.4 The weather regims for the winter season from 1999-2000 to 2007-2008 (data processing with NOAA)

The more pronounced influence of the hot air masses advections is given by the tendency of growth in the summer days as well as the number of tropical days. During the analyzed period there were years in which the number of summer days surpassed the number of 70 (1986, 1994, 1999, 2000, 2007, 2008), whilst the minimal annual number varied between 19-40 days. As for the number of tropical days, starting with the year 1986 there were registered years with over 10 days with temperatures $\geq 30^{\circ}\text{C}$, in 2001 reaching a maximum of 34 tropical days. The highest absolute maximum temperature was of 37.3°C in July 2000 and 37.2°C in July 2007, the multiannual mean being of 32.6°C (Fig. 5).

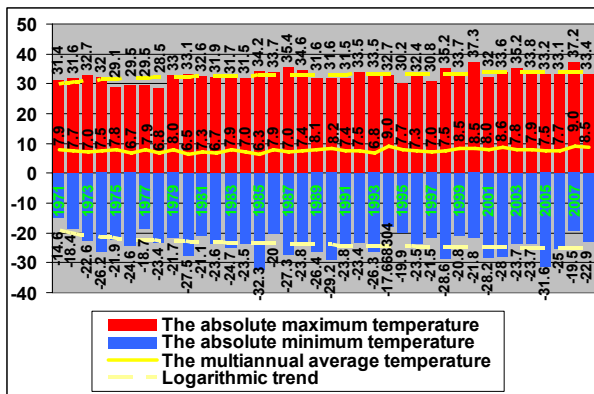


Fig. 5 The annual evolution of absolute extreme temperatures

Secondly, the lowest absolute minimal temperature was of -32.3°C in January 1985 and -31.6°C in Ferbruary 2005, the multiannual average being of $-23,7^{\circ}\text{C}$.

3. AEROLOGICAL ANALYSIS

For the precise interpretation of an airfield forecast it is necessary the analysis of synoptic and baric (aerologic) topography. The most representative maps of absolute baric topography through which the general circulation in the atmosphere can be characterized are the TA 500mb maps [4]. For the understanding of the baric situations that led to temperatures $\geq 30^{\circ}\text{C}$ at Brasov aerodrome, with a number of 325 cases between 1971-2008, I had in mind the analysis of the baric field and the analysis of the wind at 500mb. For this analysis, I used height maps from the electronic German archive and soundings from Bucharest-Baneasa and Cluj-Napoca. Thus, eight typologies referring to the tropical days registered at Brasov airfield were highlighted:

a) **Typology 1** is particular for the south-west advection. In Europe the configuration of the baric system at the level of 500mb is characteristic to the Icelandic cyclone with broadened thalweg to Central and Western Europe and the presence of a baric dorsal over Romania (Fig. 6).

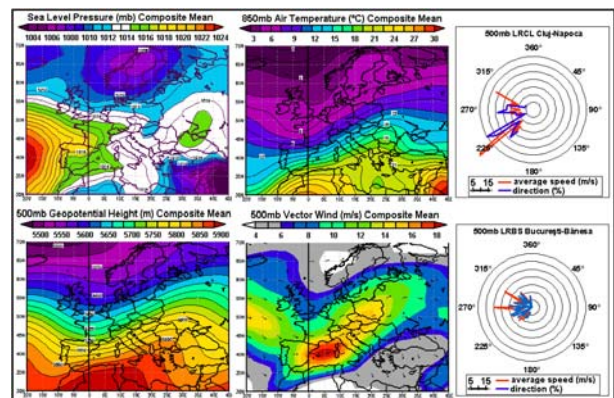


Fig. 6 Typology 1 Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

The strong advection is given by the elevated baric gradient especially in the Northwestern part of Romania; this fact is also confirmed by the medium speed of the

wind, much higher on the soundings from Cluj-Napoca compared to the diagram from Baneasa. In Romania, the medium value of the isohypse at 500mb is situated between 580-585mgp, whilst the medium pressure value at sea level is between 1013-1015hPa. This typology represents 24.9% from the tropical days cases, the medium temperature being of 31.6°C and the absolute maximum temperature reaching 35.4°C.

b) **Typology 1b** is characteristic for the southern advection. This atmospheric circulation is generated by the presence of the Mediterranean altitude cyclone in the Northern part of Italy through which it distinguishes itself from the first typology that has no ground correspondent, usually being found at the level of 500mb (Fig. 7). It was present in only 5.5% cases, the medium temperature being at 31.3°C and the absolute maximum reaching 33.6°C. The baric field at sea level and the medium value of the isohypse at 500mb have a similar representation to typology 1.

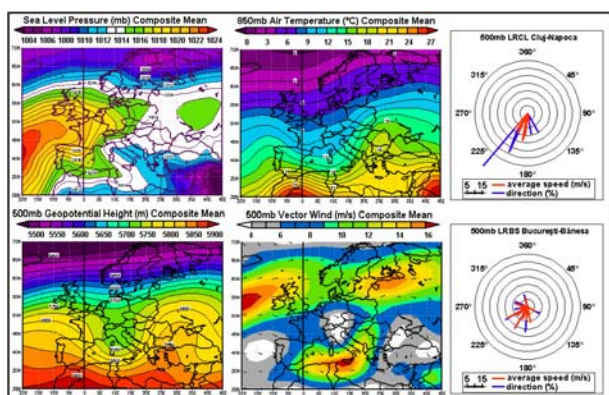


Fig. 7 Typology 1b Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

c) **Typology 1c** is characterized, unlike typology 1, through the much more advanced baric dorsal specific over Romania, which determines and maintains to the ground a higher baric regime. In most cases, the anticyclone present over Romania had an anticyclone correspondent with a closed isohypse until the level of 300mb, which determined also a lower wind regime registered at both soundings, but having a predominant direction towards North-East

(Fig. 8). Thus, in Romania's area, the medium value of the pressure at sea level is rising to 1015-1017hPa, and the medium value of the isohypses is rising to 585-587.5mgp.

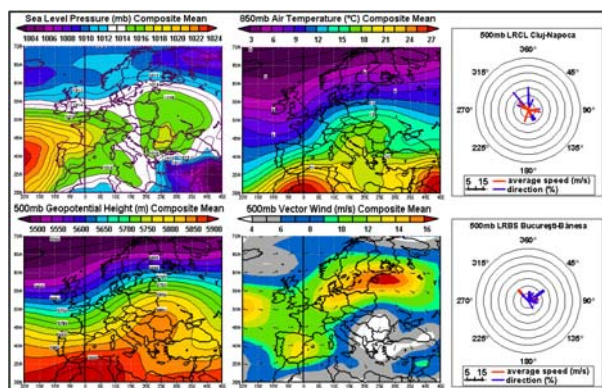


Fig. 8 Typology 1c Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

This fact leads to the maintaining of a medium temperature at 31.6°C, distinctive for typology 1, while the maximum absolute temperature is 34°C.

d) **Typology 2** marks out the presence of an altitude anticyclone in the western part of Russia that extends to the North-East of Romania whose correspondent at 500mb is a very advanced dorsal that blocks the western circulation, while the Icelandic cyclone extends to the South-Western part of Europe (Fig. 9). This typology is encountered in 5.8% cases, with the medium temperature at 32.3°C being higher than in other typologies because of the weak circulation in the medium atmosphere for this area and the influences of the warmer continental air masses. The absolute maximum temperature was at 35.5°C.

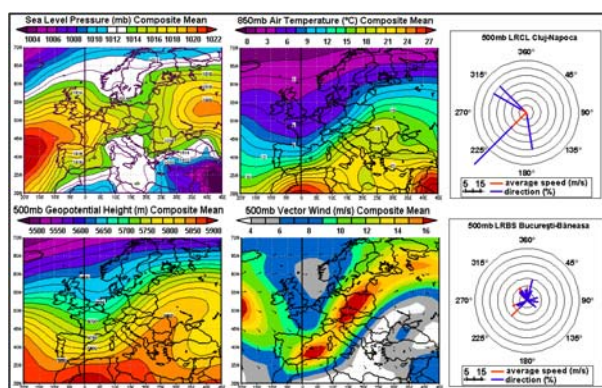


Fig. 9 Typology 2 Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

e) **Typology 2b** is characterized through the maintaining of the western advection-blocking situation specifically for typology 2, but the Icelandic cyclone is being much more active in Central Europe, which determines its influence over the circulation across our country as it can be observed in the wind distribution in both soundings (Fig. 10).

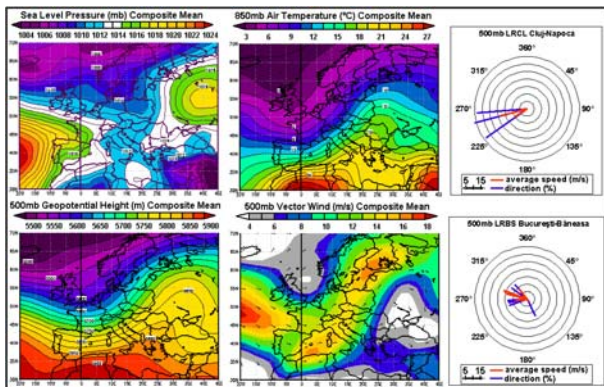


Fig. 10 Typology 2b Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

Being in proportion of about 3.7%, this typology is in most cases a passing to typologies 1 and 2, with the medium temperature recorded at 31.8°C and the absolute maximum temperature reaching 33.5°C.

f) **Typology 3** is defined by the presence of the Azores altitude anticyclone extended through Central and Eastern Europe, generating tropical-marine air masses advection, fact that leads to an absolute maximum temperature of 35°C. This typology is in 9.2% from all cases, the medium temperature being at 31.2°C.

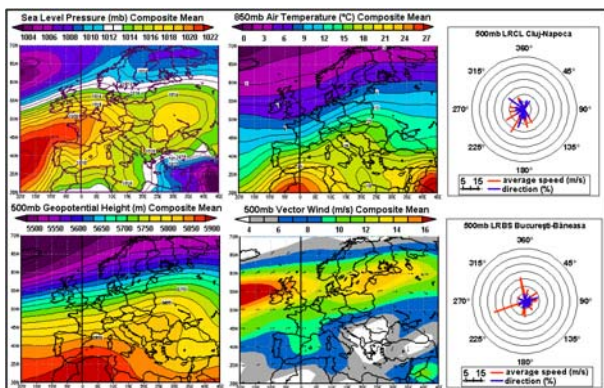


Fig. 11 Typology 3 Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

g) **Typology 3b** was found in about 2.5% instances, with the smallest number of cases. What makes this typology individuate, unlike typology 3, is the development and the weak presence of a depression over the Black Sea, the cyclogenesis being favorable due to the temperature differences between the cold air masses that are found over the Black Sea and those found over the continent (Fig. 12).

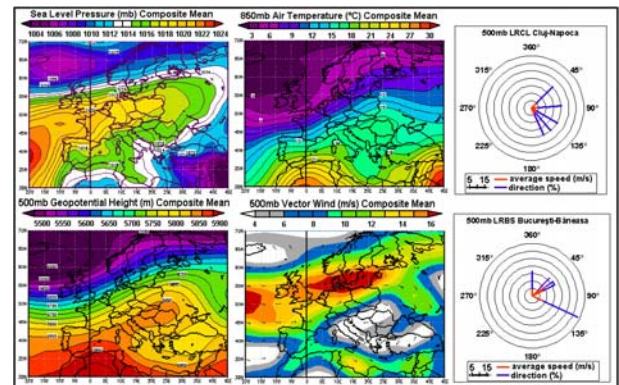


Fig. 12 Typology 3b Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

This fact determined the predominant wind direction to be East, the medium temperature maintaining around 31.3°C while the absolute maximum will reach 34°C.

h) **Typology 4** is characteristic to the western circulation at the level of Europe and it represents 39% from the cases with tropical temperatures, having the most encountered presence from all typologies.

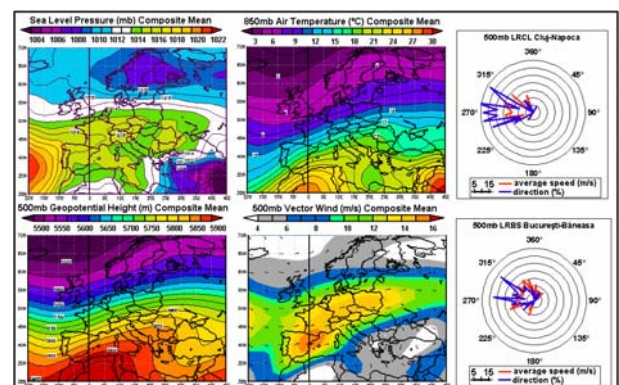


Fig. 13 Typology 4 Mediate pressure data, temperature and wind (data processing with NOAA and the University of Wyoming)

A more powerful influence of the depression regime determines the tropical-maritime air masses advection and a strong

influence of the anticyclone regime determines the tropical-continental air masses advection. Thus, the medium temperature is at 31.8°C, while the absolute maximum reaches 37.3°C.

4. CONCLUSIONS

The temperature analysis from 1971-2008 period marked out the accentuated variability of extreme temperatures and cold air advectons, but also the more pronounced influence of the anticyclonic regime. Thus, the high temperatures during winter time have lead to the growth of the annual average temperature, the highest annual medium temperature reaching 9°C in the year 2007.

The interlunar growths for the multiannual lunar averages of maximum daily temperatures are even more pronounced in the months February and March, reaching 5.56°C, and for the daily minimum temperatures reaching 7.62°C between months March and April. On the other hand, the smallest differences are found between December-January and July-August.

The pronounced variability is also given by the absolute maximum temperatures, the highest temperature being of 37.3°C in July 2000, and the lowest temperature being registered in January 1985 of -32.3°C. The dropping or growing tendency on the number of days with characteristically temperatures has restored the importance not only of the topoclimate, but also of the medium circulation in the atmosphere. Thus, for the tropical temperatures I have highlighted 8 typologies regarding the medium regimes of circulation (level 500mb). The typologies 1, 1b and 1c are characteristic mainly to the southwestern advection, at 500mb the Icelandic cyclone having the thalweg extended until over Central and Western Europe, sometimes with the presence of the Mediterranean altitude cyclone, over Romania being present a baric dorsal. The absolute maximum temperature registered was 35.4°C. Typologies 2 and 2b have as characteristics the influence of a very advanced dorsal, through the West of Russia that blocks the western circulation, while in

the southwestern part of Europe is under the influence of the Iceland cyclone. The tropical-maritime air masses influence determined by the extension to Central and Eastern Europe of the Azores anticyclone is indicated in typologies 3 and 3b. The absolute maximum temperature registered in the last four typologies had the value of 35.5°C. However, the highest temperature of 37.3°C is found in typology number 4, which is characterized by the western circulation referring to Europe, having the most encountered frequency of all typologies.

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PWM POWER CONVERTER FOR MECHANICAL SHOCKS GENERATING USING PIEZOELECTRIC TRANSDUCERS

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Abstract: This device constitutes a specific application of piezoelectric transducers, which allow the generation of mechanical shocks. The device work is based on the process of achieving of inverse piezoelectric effect. The equipment consists in a piezoelectric generator assembly and a command and supply system. The equipment was physically realized and it constituted the object of a research contract of the Optical-Electronic Institute of Bucharest. In this paper is also presented a Spice simulation of the projected equipment.

Keywords: mechanical shocks, piezoelectric transducers, PWM power converter, inverse piezoelectric effects.

1. INTRODUCTION

The device operation is based on the process of achieving inverse piezoelectric effect, meaning the deformation of the crystalline network of the piezoelectric device caused by an external electrical field. The deformation power of piezoelectric transducer is approximately 450W.

The generator is a piezoelectric transducer, which belong to the series of piezoelectric devices with elastic wave of volume. The dimensions and the composition of the piezoelectric transducers were determined depending on the working conditions and on the datum mechanical power. Many factors, included material, mechanical constructions (radiation surface area, mechanical damping, housing, connector type, etc.), electrical construction, and the external mechanical and electrical load conditions, influence the behavior of a transducer [10].

The configuration of the electro-elastic piezoelectric transducer is presented in Fig. 1.

The equipment is used for the generation of seismological shocks or as electro-acoustical press. It is a specific application of the piezoelectric crystals, which allow the obtaining mechanical shocks, based on unconventional method. The kinetic energy

for the seismologic shocks generating set developed in system is approximately 45J and 100J for the electro-acoustical press. Under the action of the electrical field produced by the excitation source, the piezoelectric generator will have an axial expansion of 0.15...0.2mm in a time of 0.1s.

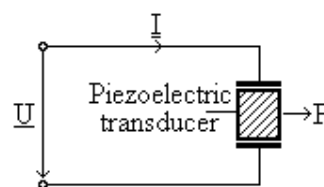


Fig. 1 Configuration of the electro-elastic piezoelectric transducer

The command and supply system of the piezoelectric device is a switch mode power supply realized using a half bridge converter - the optimally variant for capacitive loads, high voltages and output powers up to 2kW. A specific computer program is used to generate the series of datum impulses. For certain values of frequency, the equivalent electro-elastic diagram of piezoelectric transducer could be represented as a circuit with discreet elements (Fig. 2).

The elements of equivalent diagram have the following expressions and significations [5,7]:

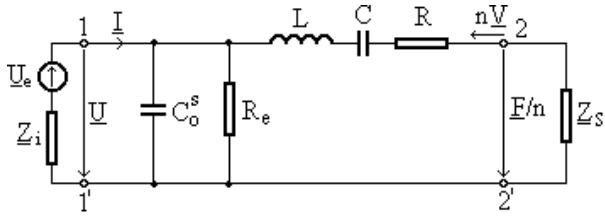


Fig. 2 Equivalent diagram of piezoelectric transducer

$$C_o^s = \frac{1}{2\pi f} \operatorname{Im} \left\{ \frac{1}{Z_{oe}} \right\} \quad (1)$$

$$R_e = \frac{Q_e}{2\pi f C_o^s} \quad (2)$$

$$L = \frac{Z_{om}}{8n^2 v_f} = Z_{om} \frac{\lambda}{16\pi f_s n^2} \quad (3)$$

$$C = \frac{4n^2}{\pi^2 f_s Z_{om}} \quad (4)$$

$$R = \frac{\pi Z_{om}}{8Q_m n^2} \quad (5)$$

Where: \underline{F} is the representative in simplified complex of elastic force at mechanical gate; \underline{V} – the representative in simplified complex of vibration speed at mechanical gate; \underline{U} , \underline{I} – the representatives in simplified complex of voltage and electrical current at electrical gate; n – the transformation ratio of ideal electro-elastic transformer; f – the oscillation frequency of electrical applied field; λ – the wave length of the gradual elastic wave; Z_{om} – the characteristic elastic impedance of the transducer; Q_m , Q_e – the qualitative mechanical and electrical factors of the transducer; f_s – the value of the frequency for which the constant phase of the transducer has the particular characteristic value at the mechanical resonance; v_f – the propagation speed of the elastic wave in the piezoelectric transducer; \underline{U}_e , \underline{Z}_i – the complex electromotive voltage and the internal complex impedance of the supply source for the piezoelectric transducer; \underline{Z}_s – the complex load impedance.

Concrete values of elements in equivalent diagram (Fig. 2) are determined by material parameters corresponding to transducer configuration and constructive sizes.

2. EQUIPMENT BLOCK DIAGRAM

Technical conditions for input and output were the following: the equipment supply is realized from the supply network – $220 \pm 15\% V$ a.c., $f = 50$ Hz; the length of the axial expansion of the piezoelectric assembly – $0.15 \dots 0.2$ mm; the period of the axial expansion of the piezoelectric assembly – 0.1 s; the operating regime – 1 pulse/10s; maximal voltage on piezoelectric device – $3500 \dots 6000 \pm 1\% V$, supply voltage variation determining the variation of the axial expanded of the piezoelectric assembly; the efficiency of excitation electronic source – $\geq 80\%$; the supply and command of the piezoelectric device were realized at maximum depth of 300 m; electrical resistance of supply cable, $R_C = 80 \Omega/\text{km}$; supplementary command device which could short-circuit the piezoelectric assembly after a period of 0.2 s from the receiving of the command input; protection against overload, supra-voltage, electrocution, radio-electronic interferences in/from network; the electronic source and piezoelectric assembly were introduced into a stainless steel cylinder with inside diameter – 105 mm, outside diameter – 110 mm and maximal height – 1 m.

The block diagram of mechanical shocks generating set, which is presented in Fig. 3, has two components: a surface equipment (A) and an equipment inside a stainless steel cylinder (B), which functions at 300 m depth. Considering the input and imposed output conditions there were established functional units, which compose the generating equipment. The functional units of the surface equipment (A) are the following: protective unit against radio-electronic interferences in/from network (A_1); rectify and filtering unit for supply voltage (A_2); auxiliary power supply of $\pm 18 V$ (A_3); auxiliary power supply for lifting motor (A_4); interface and command unit (A_5); frequency-voltage converter (A_6); circuit for amplitude discrimination of command pulses (A_7); low-pass filter (A_8). The equipment (B) has the following functional unit: steady voltage of $\pm 29 V$ for lifting motor supply (B_1); steady voltage of $\pm 15 V$ (B_2); low-pass filter (B_3); voltage-

frequency converter (B₄); filter for radio-electronic interferences (B₅); power supply for triggering circuits (B₆); circuit for width discrimination of triggering pulses (B₇); circuit for amplitude and width discrimination of command pulses (B₈); reaction circuit (B₉); circuit for discharge the piezoelectric generator (B₁₂); condensers battery (B₁₀); triggering circuits (B₁₁ and B₁₇); accumulation condenser (B₁₃); rectify unit for supply voltage of piezoelectric generator (B₁₄); high-voltage transformer (B₁₅); high-voltage switched circuits (B₁₆ and B₂₁); command circuit of power module (B₁₈); power module (B₁₉); piezoelectric generator (B₂₀); protection overload and supra-voltage unit (B₂₂).

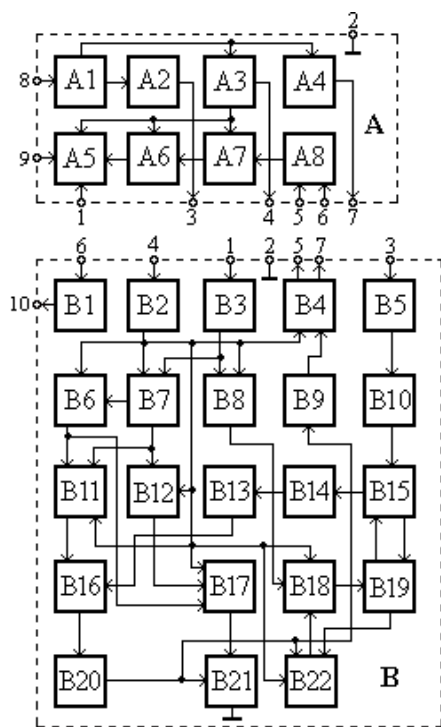


Fig. 3 Block diagram of the mechanical shocks generating set

The interface and command unit realizes the interface between PC and functional unit (B), processes input and output data, and establishes working conditions. Because the command pulses are conducted through a 300 m long cable, it was necessary to utilize some receiving circuits for command pulses, like: low-pass filter, pulse height discriminator realized with a Smith trigger, circuit for time discrimination, circuit for reject the spikes and unlike interferences.

The block diagram of designing power module is presented in Fig. 4.

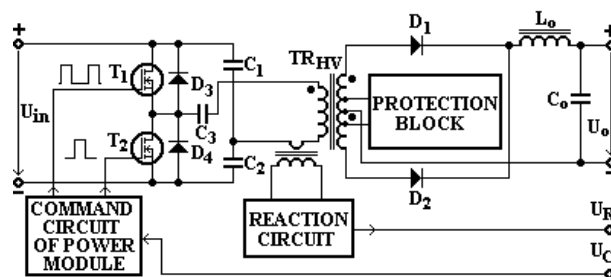


Fig. 4 Block diagram of power module

The half bridge converter is a converter with input-output galvanic isolation. The energy transfer of primary winding – load is realized during the conduction period of the switching elements. As switching elements there were used Power MOS transistors, because they allow obtain efficiency with at least 5 percentages higher than the switch mode power supplies using bipolar transducers.

The commutation frequency chosen is approximately 100kHz and duty cycle is adjusted at any point from 0 to 98%. From that results a diminution of volume for the ferromagnetic core oh the high-voltage transformer. Input and output parameters are presented on display, and working conditions are established with the computer keyboard.

The command circuit (B₁₈) realizes charge and discharge the gate-drain capacitance of Power MOS transistors, in a very short period, determining saturation or blocking them [3].

The switching elements command using the coupling transformers assures a controlled increase of the drain currents of the power transistors by applying a linear variable voltage on the gate. A way of controlling piezoelectric assembly supply current it is to control the switching sequences to the main Power MOS devices. The devices can be switched a constant frequency using a PWM method current control [1,3,8]. Controlling the PWM duty cycle and piezoelectric assembly supply current can tightly control the device piezoelectric axial expansion.

One main advantage of the PWM converter is the feasibility to drive different transducers with varying resonance frequencies without

complete redesign of the output filter. High-voltage transformer delivers necessary voltage to supply piezoelectric generator; also, it realized the load matching. The transfer of energy is made sin-phase. The output transformer is needed to ensure an electrical isolation and adjustment to the required level of output voltage.

Protection circuitry includes cycle-by-cycle current limiting, over current protection, soft start capability, voltage protection and feedback loop protection circuits.

3. DESIGNING ELEMENTS

The dimensions of the piezoelectric transducers used for the construction of the piezoelectric assembly are: external diameter, $\phi_{ext} = 38\text{mm}$; internal diameter, $\phi_{int} = 16\text{mm}$; height, $h = 6\text{mm}$. The results of the experimental researches accomplished [9] (Table 1) indicate that by supplying such a piece with a voltage of 6kV, it will be axially expanded with approximately $4\mu\text{m}$. For an axial expansion of 0.2mm, the piezoelectric device must be realized using 50 piezoelectric pieces, parallel connected.

For the mechanical shocks generator, the developed kinetic energy is equivalent with a weight of 3kg which is falling from a height of 1.5m, resulting $E_c = 45\text{J}$. Considering that the period of the axial expansion of the piezoelectric assembly is 0.1s, the mechanical power developed by the piezoelectric device is 450J/s. The equivalent capacitance of the piezoelectric device is determined using the relation:

$$C_e = \frac{2E_c}{U_o^2} \quad (6)$$

Where: U_o is the supply voltage of the piezoelectric device.

As a consequence of the experiments achieved (Table 1), it results that for a 0.15mm axial expansion of the piezoelectric device, the supply voltage necessary is 4.5kV, and for an expansion of 0.2mm, $U_o = 6\text{ kV}$.

According to relation (6), the value of the equivalent capacitance of the piezoelectric device will be: $C_e = 2.5 \dots 4.4\mu\text{F}$. Because of the low loading efficiency of the piezoelectric

device through a resistor device, it results in a primary approximation that the value of the capacitance of the accumulation condenser is: $C_a = 5.5 \dots 9\mu\text{F}$. In Table 1 there are presented a series of experimental results (axial expansion) obtained when a piezoelectric crystal and respectively an entire piezoelectric generator (stack) are supplied with different supply voltages. For a supply of a piezoelectric crystal, the experiments were realized for a great number of crystals and there were calculated the average values of the axial expansion which were obtained.

Table 1 Experimental results

U_o [V]	Measured axial expansion (d)		Calculated axial expansion d[mm]
	Piezoelectric transducer d[μm]	“Stack” d[mm]	
3000	1.98	0.096	0.099
3500	2.31	0.109	0.116
4000	2.66	0.128	0.133
4500	3.00	0.147	0.150
5000	3.34	0.163	0.167
5500	3.67	0.178	0.184
6000	4.01	0.197	0.201
6500	4.32	0.211	0.216

From the presented table it results that the measured axial expansion of the piezoelectric device is smaller than the calculated one, because of the copper electrodes, situated between the piezoelectric crystals, which retard the expansion.

Piezoelectric generator assembly (stack) is show in Fig. 5. The piezoelectric generator assembly is composed by the following elements: metallic inertial mass (1); insulated pieces (2); non-conductive metallic axle (3); copper electrodes (4); piezoelectric transducers (5); metallic piece (6); sealing piece (7); anvil (8); cylindrical stainless steel tube (9); connections between electrodes (10).

The piezoelectric generator consists in fifty piezoelectric radial polarized transducers, which are parallel connected. The piezoelectric transducers are made of ceramic materials as PZT and the research was realized using a material as $\text{Pb}(\text{Zr}_{0.53}\text{Ti}_{0.47})\text{O}_3$ doped with Nb_2O_5 , BiO_3 and MnO . The piezoelectric generator represents a preponderant capacitive load with a capacitance around $2.5\mu\text{F}$.

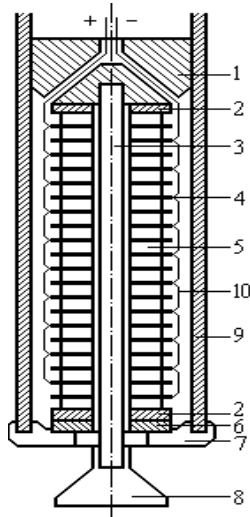


Fig. 5 Piezoelectric generator assembly

4. SPICE SIMULATION

By Spice simulation [2] was tested in time and frequency domains the power supply of piezoelectric device. In order to simplify the analysis and to reduce simulation time, from designed power supply was considered only the power module. The power supply is in essence a closed loop regulating system [4] (Fig. 6), and it must be analyzed its stability.

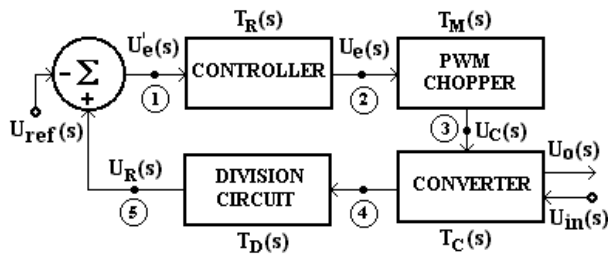


Fig. 6 Power supply as a closed loop regulating system

The converter output-control transfer function is determined by mediation method [3]. It is given by the following equation:

$$T_C(s) = \frac{U_O(s)}{U_C(s)} = K \cdot \frac{1 + \frac{s}{s_1}}{\frac{s^2}{\omega_0^2} + \frac{s}{\omega_0 \cdot Q} + 1} \quad (7)$$

Where: r_C – series equivalent resistance of transducer capacitance, C_o ; $K = \frac{n \cdot D}{2} U_{in}$;

$$\omega_0 = \frac{1}{\sqrt{L_o \cdot C_o}}; \omega_0 \cdot Q = \frac{R_S}{L_o}; s_1 = \frac{1}{r_C \cdot C_o}.$$

The transfer function of the closed loop regulating system may be expressed by the equation:

$$F(s) = \frac{U_o(s)}{U_{ref}(s)} = \frac{T_R(s) \cdot T_M(s) \cdot T_C(s)}{1 + T_D(s) \cdot T_R(s) \cdot T_M(s) \cdot T_C(s)} \Rightarrow$$

$$F(s) = \frac{S(s)}{1 + T_D(s) \cdot S(s)} \quad (8)$$

Where: $T_M(s)$ represents the PWM chopper transfer function, $T_R(s)$ is the PI controller transfer function; $T_D(s)$ is the division circuit transfer function; $S(s) = T_R(s) \cdot T_M(s) \cdot T_C(s)$ represents the open loop gain; $T_D(s) \cdot S(s)$ is the open loop transfer function.

By resolving $1 + T_D(s) \cdot S(s) = 0$ equation, are determined the closed loop transfer function poles. The waveforms for: drain currents, primary winding current of high-voltage transformer, filtering inductance (L_o) current, and supply voltage of piezoelectric device are presented in Fig. 7 and Fig. 8.

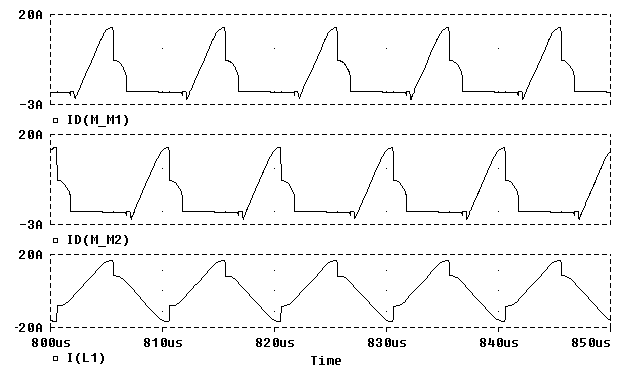
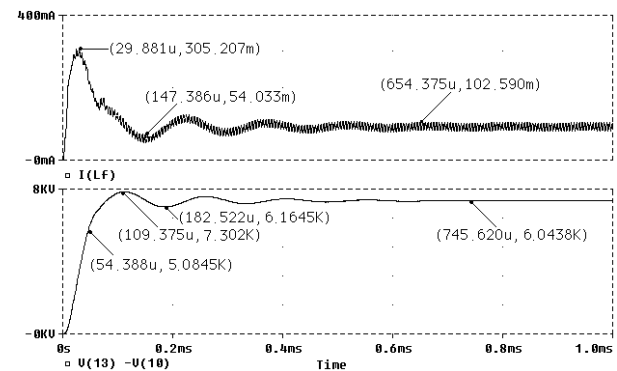


Fig. 7 Waveforms for drain currents and primary winding current of high-voltage transformer


 Fig. 8 Waveforms for filtering inductance (L_o) current and supply voltage of piezoelectric device

The waveform for piezoelectric assembly supply current is presented in Fig. 9. The value

of the intensity output current supplied by the power converter is 91,733mA, and its maximal variation is about 9mA.

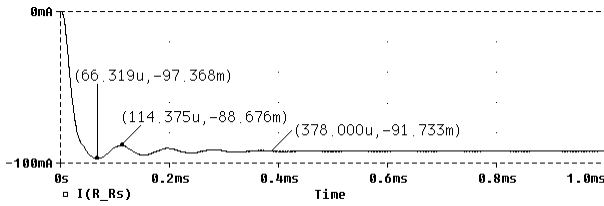


Fig. 9 Waveform for piezoelectric assembly supply current

In order to determinate the project supply response to input voltage perturbation it was considered a linear variation of the input voltage.

It was obtained by Spice simulation the waveforms for output voltage and filtering current (Fig. 10).

The current variation through high-voltage transformer primary winding is presented in Fig. 11, for a time period that lasts from 0 to 200ms.

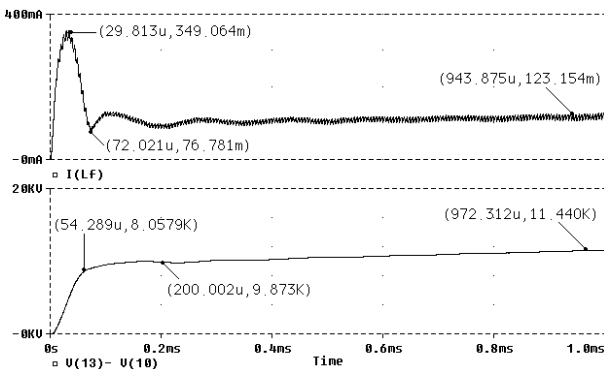


Fig. 10 Waveforms for filtering current and supply output voltage for a linear variation of the input voltage

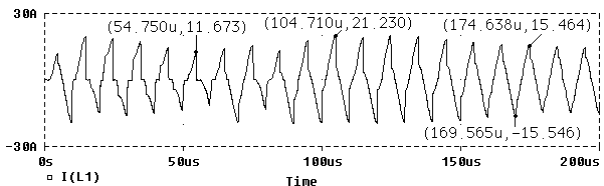


Fig. 11 Current variation through high-voltage transformer primary winding

The frequency attenuation characteristic and envelope-delay characteristic (phase response), for supply source, are presented in Fig. 12.

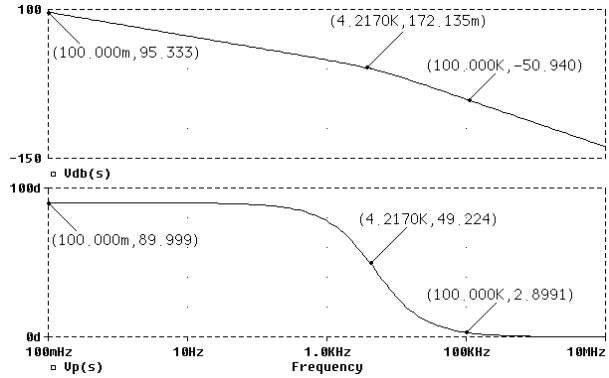


Fig. 12 Waveforms in frequency domain

The open loop transfer function of the system has a pole in fixed point, which is introduced by the controller, a double pole introduced by the converter, and two zero, one introduced by the controller and the other one introduced by the converter. The presence of pole in fixed point ensures a high gain at low frequencies.

The zero introduced by the controller is placed near the double pole introduced by the converter, so that the passing through f_{cross} is realized with value: 20dB/dec.

It results $f_{cross} = 4.2\text{kHz}$. The phase edge is positive and has the value equal to $49,3^\circ$.

5. CONCLUSIONS

The presented equipment is a complex system, purposed for generating seismological shocks or as an electro-acoustical press, by an unconventional method, using piezoelectric transducers.

It is constituted of a piezoelectric assembly composed of fifty piezoelectric transducers axial polarized, a switch mode power supply which supply the piezoelectric generator and a command block which allows to obtain the supply voltages of the electronically circuits and also to realize the operation mode.

The basis of the power supplies is a converter stage in half bridge topology. The PWM converter is able to drive the piezoelectric generator assembly, which develops a mechanical power of 450 J/s. Power MOS devices are ideally suited for this type of converter.

The advantages of power MOS devices include their simple gate drive requirements,

rugged performance, easy of use in parallel configurations, switching performances.

The numbers of piezoelectric transducers also as their geometry were established considering the mechanic energy that the stack must develop.

Considering the results of performed analyze it is allowed to affirm that the open loop transfer function of the system ensures its stability.

As a consequence of the performed Spice analysis, it results that the evolution in time of the electrical quantities and also the obtained signal levels has a good concordance with calculated values.

It was used an accumulation condenser which is discharging mediate through an high-voltage switched circuit on the piezoelectric assembly, at an external command, for transferring the electric energy from the power supply into the piezoelectric assembly.

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THE STUDY OF THE HYPOXIA AND HYPOBARISM EFFECTS CORRELATED WITH THE SATURATION LEVEL OF OXYGEN IN ARTERIAL BLOOD AT PILOTS DURING FLIGHT

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Abstract: *The physiological answer of the human body under pressure such as the one generated by flying, where numerous stimuli act simultaneously upon the pilot, has begun being studied and researched since the beginning of 1918. Meanwhile, the studies have proved crucial in enhancing the flight security, in the limitations of the accidents through a better adjustment capacity, a timely intervention of the body to compensate the effects generated by the variations of the atmospheric pressure, of temperature, of the body oxygen level and of the effects caused by accelerations, vestibular and visual illusions. The study is meant, on the one hand, to point out to what degree hypoxia and hypobarism affect the function of the correct body oxygen intake, that is its implications at the mental status level and the pilot's capacity of taking the right decision during the flight, and on the other hand, the explanation in terms of statistics of the measured experimental data.*

Keywords: *hipoxia, hypobarism, pulse-oximetry, bar chamber, physiological parameters.*

1. THE EFFECTS OF HYPOXIA ON RESPIRATION

The decrease of the barometric pressure (Pb) at altitudes causes the diminution of oxygen partial inspiration pressure and of oxygen alveolar partial pressure that is arterial blood oxygen partial pressure. Hypoxia causes a stimulation of the arterial, carotid and aorta chemo receptors, whose growth of potential transmission action generate a ventilation growth. Actually, hypoxic stimulation of chemo receptors starts causing a significant hyperventilation only when the oxygen partial pressure in the arterial blood becomes lower than 75 mmHg, a value which is specific to the healthy patient who is at an altitude of 2500m. This fact explains the absence of the ventilation reaction up to an altitude of 200-2500m, the level which causes progressively augmenting hyperventilation depending on the altitude [1].

Hypocapnia induced by hyperventilation reduces the difference of the partial pressure of oxygen between the air inspired and the

alveolar gas, diminishing the hyperventilation answer to the hypoxia. As regards to the role of hypocapnia in the ventilation command, central arterial chemo receptors stimulation by the carbonyoxide this is mediated firstly by the sensitivity at the arterial blood pH and also cephalic – rachidian liquid and secondly by the cerebral interstitial liquid [1].

Hyperventilation, characterized by increasing respiratory flow per unit time, appears as a reflex response, associated to the nerve altitude hyper excitability. It is triggered after a period of approx. 1-2 hours at altitudes of 0-2000 m, in a few minutes between 2500 and 3000 m high and almost instantly at altitudes above 5000 m, and once installed, it increases rapidly until it gets stabile at a maximum level, characterizing the state of hypoxic acclimatization of respiration. The amplification of hyperventilation not only determines the appropriate reduction of vital capacity (respiratory volume VR), which is reduced by 4 to 7% at altitudes of 1500-2000 m, 10-15% at altitudes of 4000-5000 m and 20-25% at heights exceeding 6000-7000m, but

also modifies the respiratory exchange of the two gasses, components of air (O₂ and CO₂), by the downside of their partial pressure not only from inspired air (pO₂ and pCO₂), but also in alveolar air (pA pAO₂ and CO₂), considering the that the value of 30 mmHg of pAO₂ is the maximum allowed, that untrained people can reach at the altitudes of approx. 5000 m [2,3].

2. PRESENTATION OF THE MEDHOD USED

Conducting this research involved the collaboration with the Institute of Aviation and Space Medicine of Bucharest, where military and civilian pilots have the annual medical examination in order to receive the medical opinion for flight.

The hypoxia and hypobaric state will be induced to the aeronavigant staff, subject to the study in process through a pressure chamber, connected to a computerized system that allows real-time monitoring of several physiological parameters. The created conditions (hypoxia and hypobarism) are similar to those existing at the altitude of 5500 m. This altitude is considered relevant to the study, knowing that the occurrence of changes caused by hypoxia appear with the altitude of 3600m. Tracking physiological parameters will be performed on a time period corresponding to 1050 seconds, from the beginning of test.

Cardiac and respiratory function and oximetry pulse level will be constantly monitored, the values recording being achieved as follows:

- at T₀ = time prior to the start of the test (ground);
- at T₁ = at 130 sec., corresponding to the altitude of 5500 m;
- at T₂ = at 550sec., prior to physical effort;
- at T₃ = at 700sec., after physical effort (running on a conveyor belt);
- at T₄ = at 1050sec., before descending.

3. PROTOCOL STUDY. STATISTICAL ANALYSIS

- Bar chamber samples were performed between 8:30-12:30 am in similar conditions,

rest and nutrition prior.

- Test for „simulated flight” lasted 18 minutes.
- The „cension” was performed at a speed of 40m/s up to 5500m altitude (temperature and humidity within limits of comfort).
- In the 10th minute a sample application was performed consisting of a physical running on treadmill for 20s, with a speed of 2m/s.
- The „Descent” was performed at a constant speed of 30m/s.
- During the hypoxia exposure, there were monitored on-line: ECG, oxygen saturation, altitude, temperature and humidity.
- The lot subject of the study was composed of 13 subjects, pilots with an average age of 22 years (Table 1).

Table 1 The value of pulse-oximetry during the bar chamber test

No. crt.	The value of pulse-oximetry during the test				
	Soil level T ₀ = 0	5500 meters T ₁ = 130s	Before effort T ₂ = 550s	After effort T ₃ = 700s	Before descent T ₄ = 1050s
1	98	94	81	78	83
2	96	88	75	73	74
3	97	94	77	80	86
4	97	86	82	76	80
5	97	89	84	78	78
6	98	96	83	83	81
7	95	86	74	78	85
8	95	90	78	68	75
9	96	91	77	75	77
10	97	92	77	78	74
11	96	97	83	81	81
12	96	92	81	80	76
13	97	90	88	85	89
m _a	96,5	91,1	80	77,9	79,9

4. INTERPRETATION OF TEST RESULTS WITH BAR CHAMBER

- The arithmetic average of pulse-oximetry values measured at soil level (norm bar conditions is 96.5% O₂).
- At a 5500 meters height and 130 seconds of hypoxia from the beginning of the test a decrease of pulse-oximetry is established at an arithmetic average of 91.1% O₂, 5.4 units lower than the T₀ average.
- Before the undertaking of the physical effort, at 550 seconds of exposure to hypoxia a decrease of pulse-oximetry is established at an arithmetic average of 80% O₂, 16.5 units lower

than the T_0 average and 11.1 units lower than T_1 .

- After the undertaking of the physical effort „20 seconds” running on a treadmill, at 700 seconds of exposure to hypoxia a decrease of pulse-oximetry is established at an arithmetic average of 77.9% O_2 , 18.6 units lower than the T_0 average and 2.1 units lower than T_2 .

- Before the decrease, at $T_4 = 1050$ seconds exposure to hypoxia equaling the value for 5500 meters, the average value of pulse-oximetry is 79.9% O_2 , 16.6 units lower than T_0 and 2 units lower than T_3 .

The last record, taken at 1050 seconds (17.5 minutes) from the beginning of the test shows an increase of oxygen concentration in the blood based on the adapting measures taken by the organism to the condition of hypoxia.

The arithmetic average of pulse-oximetry is 79.9% O_2 with a 2 unit increase.

There hasn't been a slower adapting process to hypoxia of the organism in the cases when the subjects of the test were smokers (4 subjects) as compared to non-smokers. The age of the subjects, as well as the shorter period of time of their being smokers did not significantly influence their capacity to resist hypoxia for a limited period of time.

Fig. 1 shows the evolution of pulse-oximetry values recorded for the whole group that has been studied, as well as the oxygen saturation depending on the time.

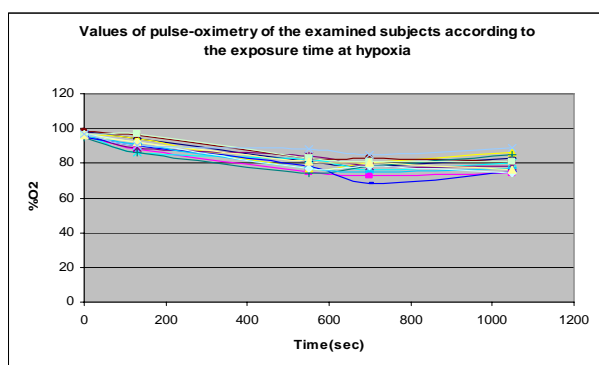


Fig. 1 Values of pulse-oximetry of the studied subjects

As a conclusion, the average arithmetic values for pulse-oximetry are the following:

$$T_0 = 96.5\% O_2;$$

$$T_1 = 91.10\% O_2 (-5.4) \text{ compared to } T_0;$$

$$T_2 = 80\% O_2 (-16.5) \text{ compared to } T_0;$$

$$T_3 = 77.90\% O_2 (-18.6) \text{ compared to } T_0;$$

$$T_4 = 79.90\% O_2 (-16.6) \text{ compared to } T_0.$$

If the SaO_2 values between 94-100% represent an optimum saturation of the Hb in O_2 , values between 93-88% represent mild hypoxemia, 88-83% represents average hypoxemia, and those lower than 83% stand for acute hypoxemia, the conclusion is obvious, that flying at altitudes of 5500m (without an oxygen mask) even with activation of the compensatory mechanisms specific to the human body, can lead to aeronautical accidents caused by changes in the mental function.

Below, the main precision statistical indicators are presented: standard correction, standard deviation, variation quotient, and standard error.

The values for oxygen saturation for the whole group of subjects are presented in charts 2 and 3 in various phases of the study. Also, these charts contain values for standard deviations as well.

It is known that the sum of apparent correction must equal zero [5,7]:

$$\sum_{i=1}^n c_i = 0 \tag{1}$$

Where: $c_i = \bar{v} - v_i$; c_i - apparent correction; \bar{v} - average frequency; v_i - individual frequency of subject i .

The standard deviation is calculated according to the relation (2):

$$s_0 = \sqrt{\frac{\sum_{i=1}^n c_i^2}{n-1}} \tag{2}$$

Where: $\sum_{i=1}^{84} c_i^2 = c_1^2 + c_2^2 + c_3^2 + \dots + c_{84}^2$

$$s_0 = \sqrt{\frac{278,92}{12}} = 4,8 \text{ at } T_0$$

$$s_1 = \sqrt{\frac{145,69}{12}} = 3,5 \text{ at } T_1$$

$$s_2 = \sqrt{\frac{196}{12}} = 4 \text{ at } T_2$$

$$s_3 = \sqrt{\frac{228,92}{12}} = 4,4 \text{ at } T_3$$

$$s_4 = \sqrt{\frac{278,92}{12}} = 4,8 \text{ at } T_4$$

Knowing *the standard deviation* that is the individual answers spreading towards the average, a measure of determination *precision* is represented.

The variation coefficient is expressed by the relation [7]:

$$CV\% = \frac{s_x}{x} \cdot 100 \quad (3)$$

In our case:

$$CV_0\% = \frac{s_{T0}}{v_{T0}} \cdot 100 = \frac{4,8}{96,50} \cdot 100 = 4,97\%$$

for: $T_0 = 0 \text{ sec}$;

$$CV_1\% = \frac{s_{T1}}{v_{T1}} \cdot 100 = \frac{3,5}{91,15} \cdot 100 = 3,8\%$$

for: $T_1 = 130 \text{ sec}$;

$$CV_2\% = \frac{s_{T2}}{v_{T2}} \cdot 100 = \frac{4}{80} \cdot 100 = 5\%$$

for: $T_2 = 550 \text{ sec}$;

$$CV_3\% = \frac{s_{T3}}{v_{T3}} \cdot 100 = \frac{4,4}{77,92} \cdot 100 = 5,6\%$$

for: $T_3 = 700 \text{ sec}$;

$$CV_4\% = \frac{s_{T4}}{v_{T4}} \cdot 100 = \frac{4,8}{79,92} \cdot 100 = 6\%$$

for: $T_4 = 1050 \text{ sec}$.

We can consider that a variation coefficient under 10% indicates a small dispersion of the data, which means that the series is homogenous.

A coefficient between 10% and 30% indicates a medium dispersion and, more than 30% indicates a large dispersion. If the dispersion is large, the average is not a representative indicator.

As a conclusion, the values registered at different exposure times at hypoxia, indicate the existence of a small dispersion of the data, the series being homogenous.

In order to find out the measurements precision, we must calculate the average deviation of the average obtained values, that is the standard error:

$$E = \frac{S_x}{\sqrt{n}} \quad (4)$$

Applied to our case, we obtain:

$$E_{T_0} = \frac{S_{T0}}{\sqrt{n}} = \frac{4,8}{\sqrt{13}} = \frac{4,8}{3,60} = 1,3$$

$$E_{T_1} = \frac{S_{T1}}{\sqrt{n}} = \frac{3,5}{\sqrt{13}} = \frac{3,5}{3,6} = 0,9$$

$$E_{T_2} = \frac{S_{T2}}{\sqrt{n}} = \frac{4}{\sqrt{13}} = \frac{4}{3,6} = 1,1$$

$$E_{T_3} = \frac{S_{T3}}{\sqrt{n}} = \frac{4,4}{\sqrt{13}} = \frac{4,4}{3,6} = 1,2$$

$$E_{T_4} = \frac{S_{T4}}{\sqrt{n}} = \frac{4,8}{\sqrt{13}} = \frac{4,8}{3,6} = 1,3$$

Table 2 The table of the individual pulse-oximetry values & the standard deviation

%O ₂ at T ₁	Correction	Correction at square	Standard deviation	%O ₂ at T ₁	Correction	Correction at square	Standard deviation	%O ₂ at T ₁	Correction	Correction at square	Standard deviation
83	-3.08	9.47	4.8	94	-2.85	8.10	3.5	81	-1	1	4
74	5.92	35.08		88	3.15	9.95		75	5	25	
86	-6.08	36.93		94	-2.85	8.10		77	3	9	
80	-0.08	0.01		86	5.15	26.56		82	-2	4	
78	1.92	3.70		89	2.15	4.64		84	-4	16	
81	-1.08	1.16		96	-4.85	23.49		83	-3	9	
85	-5.08	25.78		86	5.15	26.56		74	6	36	
75	4.92	24.24		90	1.15	1.33		78	2	4	
77	2.92	8.54		91	0.15	0.02		77	3	9	
74	5.92	35.08		92	-0.85	0.72		77	3	9	
81	-1.08	1.16		97	-5.85	34.18		83	-3	9	
76	3.92	15.39		92	-0.85	0.72		81	-1	1	
89	-9.08	82.39		90	1.15	1.33		88	-8	64	
79.92		278.92		91.15		145.69		80		196	

Table 3 The table of the individual pulse-oximetry values & the standard deviation

%O ₂ at T ₃	Correction	Correction at square	Standard deviation	%O ₂ at T ₄	Correction	Correction at square	Standard deviation
78	-0.08	0.01	4.4	83	-3.08	9.47	4.8
73	4.92	24.24		74	5.92	35.08	
80	-2.08	4.31		86	-6.08	36.93	
76	1.92	3.70		80	-0.08	0.01	
78	-0.08	0.01		78	1.92	3.70	
83	-5.08	25.78		81	-1.08	1.16	
78	-0.08	0.01		85	-5.08	25.78	
68	9.92	98.47		75	4.92	24.24	
75	2.92	8.54		77	2.92	8.54	
78	-0.08	0.01		74	5.92	35.08	
81	-3.08	9.47		81	-1.08	1.16	
80	-2.08	4.31		76	3.92	15.39	
85	-7.08	50.08		89	-9.08	82.39	
77.92		228.92		79.92		278.92	

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THE COMMUNICATIVE COMPETENCE: A NEW APPROACH

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Abstract: *The communicative competence represents the knowledge that the participants in a communicative instance need to interact and their capacity of applying this knowledge into practice, which means, using the language adequately, in various contexts. Thus, in order to ensure its formative projection, there is need for establishing a definition area. The communicative competence has known, throughout three decades, various definitions, from the linguistic competence, in Chomsky's studies, to Hymes's, Canale& Swan's, Widowson's or Bachman's models. The present article aims at reviewing these models, for sensibly projecting the communicative competence within the institutionalized educational framework.*

Keywords: *communicative competence, linguistic competence, strategic competence.*

1. INTRODUCTION

The term “competence” has just recently entered the psychology lexis, for a long period, only such terms as ‘aptitudes’, ‘skills’ or ‘abilities’ being used. As a set of projected latencies, competences have met, later on, the roles associated to specific statuses, provening from the area of sociology and together with them defining the dynamic part of those statuses. The term ‘competence’ has emerged from the fertile field of communication theory and then it started being used by other social sciences, thus contributing to the career designing. From a practical perspective, the term has become acknowledged through the psychology of labor and the human resources management, it being a decisive factor in designing educational models.

Coming from the Latin ‘*competens*’, meaning ‘competent’, which was itself derived from ‘*competere*’, a compound word consisting of the stem *com* = together and the verb *petere* = to follow, *competence*, with its current meaning in the lexis of psychology, has only started being studied since the late decades of the last century. In fact, the import of the term ‘competence’ in the area of psychology and psycho-pedagogy, and further on in the human resource management was

possible due to the Chomskyan theory.

The term ‘competence’ has started to built up its own status within psychology, defining „*the capacity, skill or ability to do something correctly or efficiently, or the scope of a person's or a group's ability or knowledge*” [1]. Recently, the term has been more and more intensely exploited, to such extent that the Great Dictionary of Psychology, published by Larousse expands its meaning area, defining it ‘in its ontogenesis’, as an ‘*assembly of the most precocious possibilities of answering in relation with the surrounding environment*’[2].

2. FROM THE LINGUISTIC COMPETENCE TO THE COMMUNICATIVE COMPETENCE

In the eighth decades of the last century, the American linguist Avram Noam Chomsky, through his studies in the area of generative linguistics, defined an ideal emitter/receiver's capacity of producing/understanding an infinite number of grammatically correct sentences as communicative competence. Thus, Chomsky did not account for the pragmatic dimension of communication, but he focused upon its semantic/syntactic projection. Consequently, he coined the phrase

“linguistic competence”, meaning, “*how language is used or acquired*” [3], and involving a linguistic acquisition, based on a universal grammar theory. In other words, the Chomskyan linguistic competence may define as an ideal speaker’s ability of using an abstract system of speech rules (the syntactic dimension), as soon as he/she has acquired the relationship between signs and the objects they represent (the semantic dimension). This ‘competence’ is the result of certain linear interactions between a deeper structure in which the linguistic faculty has already been encoded and a surface structure.

In the area of linguistics and communication, the phrase ‘communicative competence’ has suffered changes, in the meaning of its applicability to a fluid reference frame, especially through the studies of the American anthropologist and linguist Dell Hymes. From this perspective, the phrase ‘competence’ refers to the knowledge the participants need in order to interact socially and to be successful in communication, or, the ability of adapting to different communicative situations. Since Hymes considers that communication cannot be studied isolated, but only from the perspective of the effects that it produces in people’s minds, similarly, the communication competence cannot be restricted to a mere construction, following the syntactic and semantic dimensions. Hymes believes it necessary for us to perceive communication as the practical application of certain specific competences. He follows a different theoretical path from the Chomskyan perspective, namely, of knowing the language and emitting grammatically correct messages. Hymes invokes a competence that is capable of considering the linguistic performance in various contexts, that is, the communication competence represents the knowledge the participants to communication need in order to interact, and their ability of applying it practically by using the language adequately, in various contexts. Hymes takes into consideration four aspects of this competence: possibility, feasibility, appropriateness and probability, by asking four questions:

a) *Whether (and to what degree) something is formally possible*

b) *Whether (and to what degree) something is feasible*

c) *Whether (and to what degree) something is appropriate*

d) *Whether (and to what degree) something is done* [4].

Hymes proposed the study of the communicative competence out of the necessity for it to include the social dimension as well, starting from the study of the interaction between singular linguistic systems and the individual’s psycholinguistic abilities, in the context of certain impositions with regard to the character of communication and its adjustment to the context. Consequently, Hymes took into account the knowledge of whatever is possible, doable and achievable or even given in the communication situation and he underlined the necessity of a theory concerning the communicative competence, starting from the four dimensions mentioned above.

3. THE CANALE AND SWAIN’S MODEL OF COMMUNICATIVE COMPETENCE

Starting from Hymes’ s theory, Canale and Swain include the linguistic competence within the larger concept of the communicative competence, arguing that there are rules of using the language that are ineffective in the absence of grammar norms. The model Canale-Swain [5] distinguishes four areas of competence able to cover our study area: grammatical, sociolinguistic, discursive and strategic. Initially, starting from a piece of criticism to Hymes, Canale and Swain propose a communicative competence focused on the grammatical, sociolinguistic and strategic dimensions, to which, later on the discursive competence as part of the sociolinguistic competence is added, together with the socio-cultural competence.

The grammatical competence entails knowledge of phonology, orthography, vocabulary, structure, word formation and sentence formation etc. The sociolinguistic competence involves knowledge of sociolinguistic norms of using the language, that is, the capacity of using the language in various sociolinguistic contexts, of

communicating within the limits imposed by a particular topic of discussion or of using adequate grammar forms for different communicative functions, in various sociolinguistic contexts.

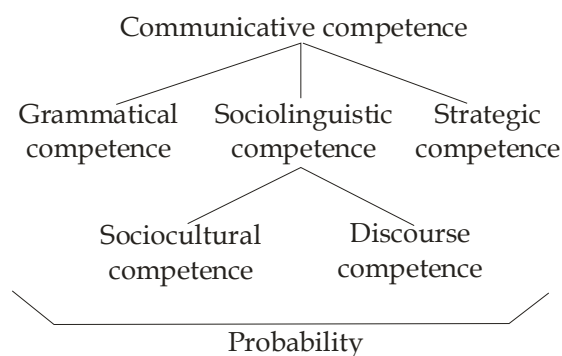


Fig. 1 Diagrammatic representation of Canale and Swain's components of communicative competence [6]

The discursive competence refers to the capacity of understanding and producing texts, in agreement with the general discursive requirements: cohesion/coherence, relevance and pertinence. The strategic competence, following the Canale-Swain model, involves the compensatory strategies used when speech difficulties occur (either of grammatical, sociolinguistic or discursive nature), such as: „the use of reference sources, grammatical and lexical paraphrase, requests for repetition, clarification, slower speech, or problem in addressing strangers when unsure of their social status or in finding the right cohesion devices.” [7].

This final dimension implies, thus, compensation in communication, as a result of a limitation of the performing variables of an individual's or as a result of a certain insufficiency with regard to competence. Unlike Chomsky, Hymes introduced, within the communicative competence concept, the ability of using the language. Canale and Swain remarked that researchers had ignored the phrase “ability for use” and that there weren't theories concerning the human action able to adequately explain the phrase, its explanation depending on social classes. Therefore, American scientists have transferred the phrase “ability for use” to the area of communicative performance.

4. WIDDOWSON 'S MODEL OF THE COMMUNICATIVE COMPETENCE

The above scientists' attempt has been continued by the studies of the British Henry G. Widdowson, who distinguished between the concepts of *knowledge* and *ability*. The former refers to an understanding of linguistic and sociolinguistic conventions, the latter regards the ability of using knowledge to create meanings within a language. This involves, in Widdowson's further studies, that knowing a language means much more than knowing its linguistic structures, „it also involves knowing how they interact syntactically as carriers of meaning being determined by the functions a language has evolved to serve” [8].

While in case of the first dimension, knowledge, there is need for the analysis and application of certain rules, named by the British linguist the internal function of the linguistic code structures, the use of language implies the knowledge of the grammar approach to adequate meanings in various contexts, that is, an external function. Competence, thus, stands for more than mere knowledge, it represents the ability of using the knowledge in accordance with conventions. Furthermore, Widdowson's model is shaped as shown below:

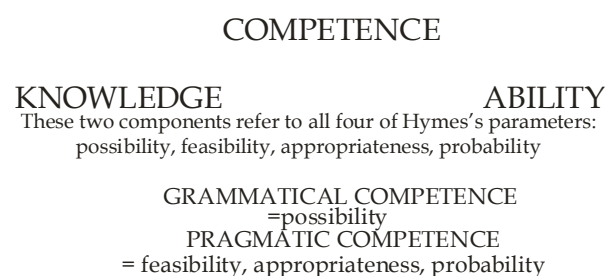


Fig. 2 Widdowson's model of communicative competence

For Widdowson, knowledge may be characterized in terms of degree of *analyzability*, while the ability of using the language is measured in terms of *accessibility*. Whereas analyzability refers to the manner in which the mental representation of knowledge are built, structured and made explicit, accessibility regards the ease and rapidity with

which knowledge may be accessed for using the language. Analyzability becomes, accordingly, the reference parameter for learning a language, while accessibility represents the reference parameter of the communicative act. From such a perspective, it is obvious that both knowledge and the ability of using the language are inseparable and become a prerequisite for each other.

5. BACHMAN'S INTEGRATIVE MODEL

In his attempt to incorporate the ideas concerning the communicative competence from the models of Michael Canale, Merrill Swain and Sandy Savignon, so as to design language tests, while considering the Canale-Swain model a static one, Lyle F. Bachman (1990) proposes a communicative competence model, named the *communicative language ability* (CLA). The components of this model are as follows [9]:

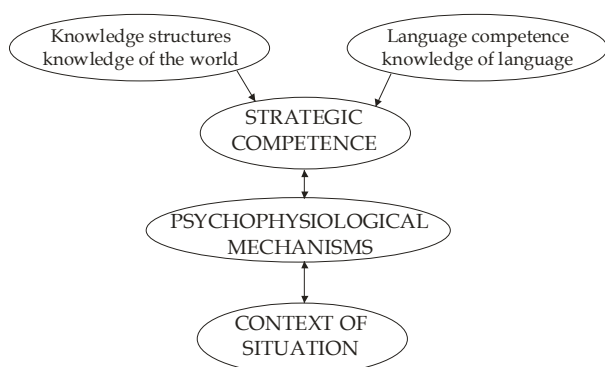


Fig. 3 Components of communicative language ability in communicative language use

- the linguistic competence, representing a set of elements used in communication via language;
- the strategic competence, characterizing the mental capacity of implementing the components of the communicative competence in the contextualized use of the language, aiming at relating the language with the context in which it is produced and with the cognitive structure of the user and regarding the socio-cultural component and the one referring to knowledge of the real world;
- the individual's psycho-physiological mechanisms, regarding the neurological and

psychological processes, seen as physical phenomena, necessary for the use of language.

The linguistic competence entails two major dimensions [10]: organizational and pragmatic.

The organizational competence comprises elements related to the formal structure of the language, including the grammatical competence and the textual one. The grammatical competence focuses on aspects such as vocabulary, morphology, syntax, phonology/ graphology etc., while the textual competence involves knowledge of conventions necessary for putting together the discourse elements so as they can make up a text, written or uttered, following the rules of cohesion and rhetorical organization.

The pragmatic competence aims at the relations between the discursive unities and acts or functions, which users of the language try to achieve through these discursive unities. These unities and highlight the illocutionary dimension, respectively, the characteristics of the context for using the language, which determines the appropriateness degree of the latter. It includes the illocutionary and the sociolinguistic competences. The illocutionary competence, originating in the speech acts' theory, focuses both on the use of language with illocutionary force and the interpretation of the illocutionary force of the communication partner, and sends to the existence and activation of a set of four functions:

- the ideational function, via which we express ourselves in terms of our own experience in relation with the real world;
- the manipulation function, by which we aim at influencing, this function comprising the instrumental function, regarding the use of performatives, that is performing actions at the same time with utterances, the regulatory function, necessary for controlling others' behavior and influencing the medium, and, respectively, the interactional function, aiming at using the language to form, maintain or change interpersonal relationships;
- the heuristic function, regarding the use of language for the extension of knowledge through teaching acts, learning, problem solving or conscious memorization;

- the imaginative function, dealing with the expansion of its own production medium for aesthetical or comical/ironical purposes;

The sociolinguistic competence covers the control over the conventions for using the language, established by the production context. It also implies the sensitivity to dialect/sub-dialect/idiom, sensitivity to register – concerning the variations within a single dialect, sub-dialect or idiom, sensitivity to naturalness – concerning the manner in which

elements of the language are formulated and interpreted, not in the sense of linguistic accuracy, but in the sense of belonging, by birth, to that particular language (*nativelike way*), and, respectively, the use and interpretation of cultural references and of speech figures.

In a schematic representation, the components of the linguistic competence in Bachman's CLA model are structured as follows:

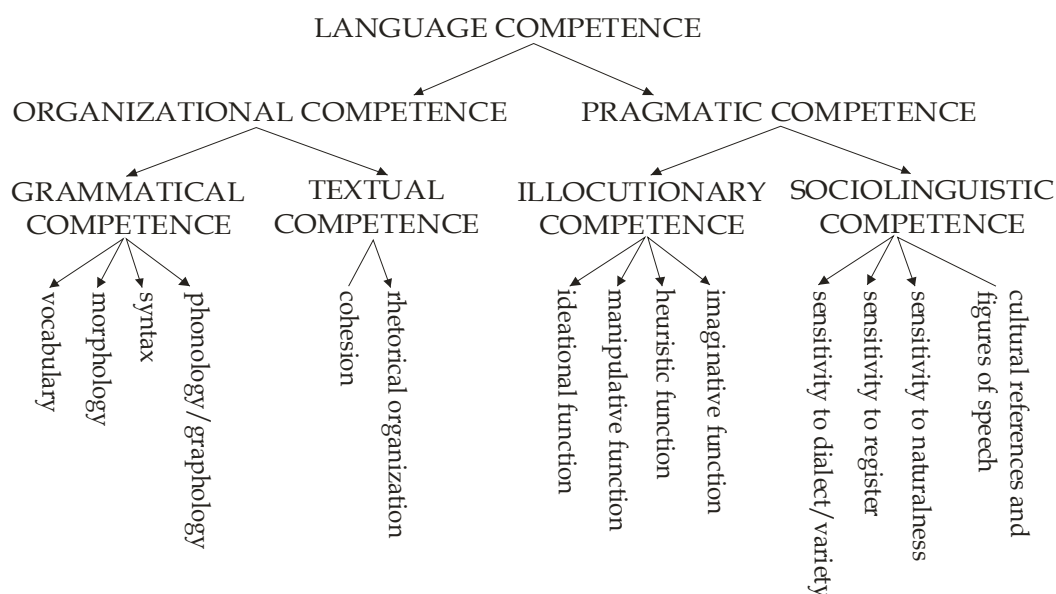


Fig. 4 Components of language competence

The strategic competence preserves the same meaning as in the studies of Canale and Swain. It represents the mental capacity of participants in the act of speech to compensate for the lacks of the components of the linguistic competence in using the language in various communicative contexts, as long as the communicative strategy, generally speaking, sees the interlocutors' attempt to agree upon a meaning. The components of this competence are: *assessment, planning, execution* [11].

The evaluative component involves relating to a communicative scope in a given mental context, identification of the requested information and of available language resources, respectively, the interlocutor's evaluation. In a systematized manner, „*the assessment component enables us to (1) identify the information – including the language variety, or dialogue – that is needed for realizing a particular communicative goal*

in a given context; (2) determine what language competences (native language, second or foreign language) are at our disposal for effectively bringing that information to bear in achieving the communicative goal; (3) ascertain the abilities and knowledge that are shared, by our interlocutor; and (4) following the communication attempt, evaluate the extent to which the communicative goal has been achieved” [12].

The planning component regards the rectification of relevant elements of the linguistic competence, of various natures, such as: grammar, textual, illocutionary or sociolinguistic and designing a plan able to lead to the accomplishment of the communicative goal.

The executive component implies psychophysiological mechanisms in the plan implementation, in accordance with the

manner and channel adequate to the communicative goal and production context.

In a schematic representation, the use of language, according to CLA components, requires an inter-relating of the strategic competence with the linguistic competence, with the psycho-physiological mechanisms and the context, as follows [13]:

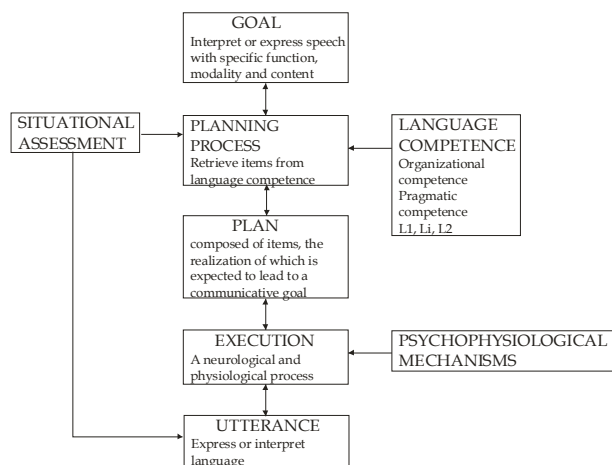


Fig. 5 A model for the use of language, an extension of the Færch-Kasper model

6. CONCLUSIONS

The sensible projection of the communicative competence formation in the educational area does no longer represent a ‘caprice’, but a necessity.

The very normative defining framework asks for reconsideration, and this starts from the European recommendation with regard to key competences for life-long learning. According to it, the first two projected competences are: communication in the mother tongue and communication in foreign languages [14].

The projection of the communicative competence in Romania becomes compulsory for the adequate formation within the institutionalized educational system adjusted to the society’s demands.

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UPRIGHT PERSONS WILL APPLY ETHICS IN MANAGEMENT

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***Abstract:** This paper has the purpose of transmitting information and ideas about the things that stand at the foundation of performance assessment destined to bring success in private life and also in the organisation development.*

***Keywords:** management, development, efficiency, responsibility.*

1. THE MANAGERIAL SKILLS

When we say about someone that he/ she is upright, we acknowledge in him/ her the feeling of self- satisfaction due to consistency, because his/ her beliefs will be reflected in his/ her behaviour, harmonizing their psyche, which acts as an axis for a happy person, making him/ her consistent despite the events which he/she encounters.

The persons with managerial skills are able to:

- be positive, dedicating more time to do what they want according to their dreams/ ideals, instead of marking time by trying to putting others in their place;
- to control stress and irritation;
- to resist to manipulation and intimidation from the people around them, identifying and solving issues at the core of this attitude;
- to negotiate conflict solving;
- to interpret and use non-verbal signals;
- to identify positive/ aggressive/ passive behaviour in others and in themselves;
- to refuse someone without feeling guilty;
- to use the feedback technique in order to convey to others their opinion about the good and bad things they do;
- to use paraphrases into communication in order to ensure that they understood what has been said;
- to control their own negative feelings.

In the light of the above mentioned aspects, we find it opportune to emphasize the

competence of the young military students (future officers for the Infantry and Air Force) and civilians (future doctors) regarding the competence of applying ethics into management (reflecting emotional intelligence in dominating the own negative emotions and to transmit positive emotions to the others). We used as a measuring system two indicators: the capacity of not surrendering to manipulators and the Machiavellian attitude (the inclination to manipulate the others).

The first measuring instrument is an adapted version of the Mach VI Scale test by Richard Christie and Florence Geis, which was first, published in 1990 in “Studies in Machiavellism”, New York, Academic Press. The questionnaire contains rather popular points of view and opinions. The assessment of the tendency to manipulate is done by summing up the score from all 15 statements, a personal score which may vary between a maximum of +30 and a minimum of -30.

The more the score approaches +30, the deeper are the Machiavellian skills, i.e. the person does not give up after failure, persevering in applying an increasing number of manipulation techniques until reaching the goal and perceiving on an emotional level feelings of satisfaction when the manipulation of others achieves its targets.

The more a person's score approaches -30, the more upright, honest and unselfish the person is, as the negative value of the score is drawing near the minimum accepted value.

2. RESULTS OF THE 2009 SURVEY

We established three samples of 12 subjects each:

- SAMPLE 1 made up of infantry students;
- SAMPLE 2 made up of military students-navigating aviators from the Air Force;
- SAMPLE 3 made up of civilian students from the Faculty of Medicine.

The three samples of military and civilian students, as well as the results of applying the two tests, which have already been presented in terms of content and interpretation, are depicted in the Tables no. 4, 5, 6.

The purpose of the survey was to check the following hypotheses:

I. Are there in all three samples both subjects with Machiavellian attitude and upright ones or not.

II. Can the subjects with Machiavellian attitudes be found to a greater extent in sample 3 than in the samples 1 and 2 or not.

Can subjects with greater competence as to applying ethics into management be found to a greater extent in sample 3 than in the samples 1 and 2 or not.

3. VALIDATION OF THE RESULTS

Statistical calculations for the determination of the error probability in the interpretation of the data collected in the 2009 inquiry

Validation of the score of Machiavellism

Percentage of manipulators in the three samples:

Sample no. 1
(50% are manipulators and 50% are upright)

xi → $\bar{x}_1 = (\sum xi)/12 = 1,08(3)$	Standard deviation $\sigma_1 = xi - \bar{x}_1$	Variation σ_1^2
-12	-13.08(3)	171.16
-5	-6.08(3)	37.002
-3	-4.08(3)	16.67
-3	-4.08(3)	16.67
0	-1.08(3)	1.172
0	-1.08(3)	1.172
+2	+0.917	0.840
+4	+2.917	8.508
+5	+3.917	15.34
+8	+6.917	47.84
+8	+6.917	47.84
+9	+7.917	62.67

Sample no.2
(83,3 % are manipulators and 16.7% are upright)

xi → $\bar{x}_2 = (\sum xi)/12 = 4,33$	Standard deviation $\sigma_2 = xi - \bar{x}_2$	Variation σ_2^2
-11	-15.33	235.008
0	-4.33	18.74
+1	-3.33	11.08
+1	-3.33	11.08
+4	-0.33	0.108
+7	+2.67	7.128
+7	+2.67	7.128
+8	+3.67	13.46
+8	+3.67	13.46
+8	+3.67	13.46
+9	+4.67	21.808
+10	+5.67	32.14

Sample no.3
(25 % are manipulators and 75% are upright)

xi → $\bar{x}_3 = (\sum xi)/12 = 4,0(83)$	Standard deviation $\sigma_3 = xi - \bar{x}_3$	Variation σ_3^2
-6	-1.917	3.67
-4	-0.08(3)	0.325
-5	-0.917	0.840
-8	-3.917	15.342
-8	-3.917	15.342
-16	-11.917	142.014
-5	-0.917	0.840
-14	-9.917	98.342
0	+4.083	16.67
1	+5.08(3)	25.836
8	+12.08(3)	145.998
8	+12.08(3)	145.998

We compare the average from sample 1 to the average from sample 2 and apply test "t", i.e. we use formula (1):

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{[(\sum \sigma_1)^2 \cdot 11 + (\sum \sigma_2)^2 \cdot 11] / 22 \cdot \sqrt{1/12 + 1/12}}} \quad (1)$$

Common standard deviation is calculated using formula (2):

$$\sqrt{[(\sum \sigma_1)^2 \cdot 11 + (\sum \sigma_2)^2 \cdot 11] / 22} \quad (2)$$

$$t_{\text{calculated}} = -0.3951082$$

Looking into the table of "t" values on the row indicated by the liberty threshold (n1+n2-2) and in the column indicated by the probability threshold, 0.20, (i.e. at the intersection of column 0.20 with line 22) we find the value of $t_{\text{critical}} = +1.32$.

$$t_{\text{calculated}} < t_{\text{critical}} ; -0.3951082 < +1.32 \rightarrow$$

Null hypotheses 3 and 4 are accepted.

With an error risk of 20%, we conclude that the two environments from samples 1 and 2 not differ significantly. By observing the two environments we notice that the subjects from sample 1 are less ready to manipulate than subjects from sample 2 ($1.08(3) < 4.44$).

We compare the average from sample 1 to the average from sample 3 and apply test “t”, i.e. we use formula (3):

$$t = \frac{\bar{X}_1 - \bar{X}_3}{\sqrt{[(\sum \sigma_1)^2 \cdot 11 + (\sum \sigma_3)^2 \cdot 11] / 22 \cdot \sqrt{1/12 + 1/12}}} \quad (3)$$

Common standard deviation is calculated using formula (4):

$$\sqrt{[(\sum \sigma_1)^2 \cdot 11 + (\sum \sigma_3)^2 \cdot 11] / 22} \quad (4)$$

$$t_{\text{calculated}} = 0.5557826$$

Looking into the table of “t” values on the row indicated by the liberty threshold and in $(n_1 + n_2 - 2)$ the column indicated by the probability threshold, 0.20, (i.e. at the intersection of column 0,20 with line 22) we find the value of $t_{\text{critical}} = +1.32$.

$t_{\text{calculated}} < t_{\text{critical}} ; 0.5557826 < +1.32 \rightarrow$
Null Hypotheses 3 and 4 are accepted.

With an error risk of 20%, we conclude that the two environments from samples 1 and 3 not differ significantly. By observing the two environments we notice that the subjects from sample 3 are less ready to manipulate than subjects from sample 1 ($1.08(3) < 4.44$).

By comparing the average with the norm of not using manipulation techniques, meaning being an upright person, in sample no.1, we apply test “t”, but this time using formula (5):

$$t = (\text{average of sample 1} + \text{norm}) / [(\text{standard deviation in sample 1} + \text{norm}) / \sqrt{\text{number of subjects in sample 1}}] \quad (5)$$

Standard deviation from sample one is calculated using formula (6):

$$\sqrt{\frac{\sum (\text{values})^2 - \sum (\text{values})^2 / \text{number of values}}{\text{number of values} - 1}} \quad (6)$$

$$t_{\text{critical}} = +1.37$$

$t_{\text{calculated}} < t_{\text{critical}} ; 0.6188571 < +1.37 \rightarrow$
Null Hypothesis 2 is accepted.

With an error risk of 20%, we conclude that 50% of the subjects from sample no.1 present a slight tendency of using manipulation techniques, while the other 50% do not use manipulation techniques, because they are upright people. After observing the average and the norm we conclude that the subjects in sample no.1 are inclined towards manipulating others ($0 < 1.08(3)$).

By comparing, in sample 2, the average with the norm of not using manipulation techniques, meaning being an upright person, we apply the “t” test, using formula (7):

$$t = (\text{average of sample 2} + \text{norm}) / [(\text{standard deviation in sample 2} + \text{norm}) / \sqrt{\text{number of subjects in sample 2}}] \quad (7)$$

Standard deviation from sample 2 is calculated using formula (6).

$$t_{\text{critical}} = +1.80$$

$t_{\text{calculated}} > t_{\text{critical}} ; 2.1037984 > +1.80 \rightarrow$
Null Hypothesis 2 is rejected

With an error risk of 10%, we conclude that 83.3% of the subjects from sample no.2 have the tendency to use manipulation techniques, while the rest, representing 16.7% do not use manipulation techniques, because they are upright people. After observing the average and the norm we conclude that the subjects from sample no.2 are very inclined towards manipulating others ($0 < 4,33$).

By comparing the average with the norm of not using manipulation techniques, meaning being an upright person, in sample no.3, we apply test “t”, using formula (8):

$$t = (\text{average of sample 3} + \text{norm}) / [(\text{standard deviation in sample 3} + \text{norm}) / \sqrt{\text{number of subjects in sample 3}}] \quad (8)$$

Standard deviation from sample 3 is calculated using formula (6).

Looking into the table of “t” values on the row indicated by the liberty threshold and

(n3-1) in the column indicated by the probability threshold, 0.20, (i.e. at the intersection of column 0.20 with line 11) we find the value of t_{critical} :

$$t_{\text{critical}} = +1.37$$

$t_{\text{calculated}} > t_{\text{critical}}$; $-1.7204819 > +1.37 \rightarrow$
Null Hypothesis 2 is rejected

With an error risk of 20%, we conclude that 25% of the subjects from sample no.3 have a slight tendency to use manipulation techniques, while the remaining 75% do not use manipulation techniques, because they are

upright people. After observing the average and the norm we conclude that the subjects from sample no.3 are not inclined towards manipulating others ($-4.08(3) < 0$).

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FACTORS WHICH HAVE LED INTERNATIONAL DEVELOPMENTS OF MARKETING MANAGEMENT

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Abstract: Last decades of this century have imposed a new concept that is MARKETING a high frequency both in theory and practice of socio-economic. Modern marketing is now considered essential factor of success of an organization, essential to economic development and social, miraculous solution that solves problems, the basic tool in achieving great performance, but also in risk avoidance.

Keywords: management, marketing, theory, practice, functions.

1. INTRODUCTION

Marketing is a young science. He appeared in early twentieth century, although some marketing techniques are found in human history (eg posters). In the first 30 years the emphasis falls on the product ("a good product is sold by itself). Between 40 and 50 marketing is based on sales, which led to the development of sales techniques, such labeling is marketing for sale. Developed and then move towards the consumer - a consumer is a satisfied higher.

The orientation and the relationship between seller and consumer, it has emerged over the past 10-15 years. Currently, due to pressure of consume, laws, regulations are becoming more important. The issue is whether she has the right to sell and under what conditions: the economy is the stage environment. The enterprise takes care to take into account the wishes of the public.

2. MARKETING THEORY AND PRACTICE

Marketing concept, formulated at the beginning of our century, has developed rapidly, reflecting the economic and social developments of this century and in fact marks the transition from the production to a

company consumer marketing is a very complex phenomenon that combines theory with practice for each show one side or the other of it [1].

A summary of views expressed in the postwar period has led the experts to conclude that developments in marketing have outlined three steps:

1. characterized by enlargement of introducing the concept of exchange;
2. concentrated towards marketing as a science;
3. concerned the use of schematic concept development and its use in a more differentiated.

If you look at how it was defined the concept of marketing during these stages, we can distinguish two categories of definitions [2]:

1. *The classic definition (narrow definitions)* old, with a restricted scope, narrow, according to which marketing deals directed to flow from producer to consumer-oriented sales, translated in practice by the imperative "sell what you produced".
2. *The modern definition (broad definition)*, the wide range, complex, addressing marketing as a social and economic must be in practice by the imperative "to produce only what can sell". Summary ideate modern definitions of marketing allows us

to conclude that this complex phenomenon of our century, specifically the market economy must be addressed as:

- a. *business philosophy*, as a way of thinking is a philosophy of the organization, an economic-oriented attitude that the customer will achieve the objective essential to obtain benefits only by satisfying consumer needs;
- b. *business practice*, a process and management function, the transformation of ideas about marketing descriptive seen in action, and the resolution of issues subject to practical marketing. So, marketing is not just theory but practice, a set of activities which have as purpose to obtain maximum efficiency in the use of limited resources to meet consumer needs, always growing and increasingly diverse in structure and quality;
- c. instrument-based management methods and techniques of research involving the use of marketing tools, a set of methods, procedures, techniques and action research: analysis, forecasting and control organization to ensure adequate and relevant information to be to reach in time, information obtained from market research, investigation procedures and policies for promotion and distribution of goods and services. Based on this information, processed and interpreted using a whole arsenal of techniques and procedures, prepare decisions for the current and prospective, pivotal role of being instruments forecast market phenomena, which are then used mainly in that the programs and actions marketing.

3. MARKETING CONCEPT

A place of great importance in the marketing of the organization held concept, a philosophy that guides the activities of marketing, resulted in its orientation. Practice has shown the existence of several alternative concepts by which organizations can achieve their marketing activities, namely: the concept of production, products, sales, marketing, social marketing.

A. *Production orientation* is specific to organizations that rely on mass production, they are tempted to produce more efficiently

and at a price which is beneficial both for the organization and for the consumer. It is one of the oldest guidelines requires focusing on efficiency and distribution.

B. *Oriented product* is characterized by the manufacturer focusing on improving product sometimes interpret them incorrectly. Thus, often eludeas they have difficulties in handling consumer products or their products before aging and the emergence of others that may lead to bankruptcy [3].

C. *Guideline for sales based* on the fact that generally do not buy enough products unless the organization influence customers through persuasion and promotion, convince them to buy. This guidance emphasizes the organization's goals and not the client and applies especially for goods with search, which some consumers are not thinking to buy.

D. *Oriented marketing* is a business aimed at achieving the objectives of the organization by satisfying the wishes and needs of consumers better than competitors. This concept puts the consumer in the spotlight organization, which means knowing and anticipating customer desires before deciding what to produce or sell so as to give the customer what he wants. Marketing orientation is based on four important elements: target market, consumer needs, coordinated marketing and profitability:

a) Target market should be identified as it is not possible nor desirable for an organization to conduct the products or services to all potential customers, because resources are insufficient, potential customers are geographically dispersed, there are strong competitors that have some market and customer needs to change very quickly, etc.

b) Needs are much diversified and therefore knowledge of their quantitative aspects, structural and quality is not easy to achieve. But the organization must define in terms of customer care and he has limited resources to meet them. Concern the organization must satisfy the real needs of consumers better than other competitors.

c) Coordinated marketing aimed first referencing various marketing activities (market study, product policy, promotion, sale, etc.). Corresponding to customer needs, so that all employees are aware that customer satisfaction depends on each of them.

d) Profitability is the purpose of any economic organization, design and marketing enables him to achieve it, if you produce goods and services for which demand exists solvent.

E. *Societal marketing concept* is the newest alternative marketing driven by the need to avoid conflicts that may occur as a result of implementation of the concept of marketing between the consumer interests organizations producing goods and services and the welfare society in the long term. For this purpose it is necessary to research the environment in which the organization works to know that uncontrollable forces surrounding a behavior to learn why customers buy goods and services, the course and the market that it offers the most data on what to produce, how, how the structure and quality, when and for whom.

4. MARKETING STRATEGY

It marks the direction that was chosen for the marketing objectives and the means must to be used for this purpose. Marketing strategy has two components: delineation of the market that will work and making the marketing mix. Demarcation of market segmentation is done by consumers because of its behavior different from a product or a necessity. Segmentation is a process through which potential customers are divided into groups with traits or similar purchasing habits. Next segment or segments which will address the product or service, setting the target group. Building marketing mix plays a significant role in targeting marketing activity based on internal resources and market conditions.

Marketing mix is a certain structure combined efforts in certain proportions to obtain the necessary efficiency goals stability. The administration consists of a set of controllable variables that organization to harmonize in order to obtain the desired response from the target market.

5. MARKETING TACTICS

Marketing tactics is - the detailed and concrete actions through which the practice in a particular strategic objective of business marketing P. Malcomete [4].

6. MARKETING MANAGEMENT

Management business is marketing - analysis, planning, implementing and monitoring programs designed to create, expand and maintain beneficial exchanges with target consumers, in order to achieve organization objectives. Planning is a process that guides and coordinates marketing activities with the aim administration organization objectives. Carrying out the tasks set by the organization requires resources and establishes the responsibilities incumbent on managers to implement marketing.

The market developed and applied in developed countries with very favorable results in increasing living extends past decades and other countries. Experience shows that it affects everyone but in different ways, and creating conflicts of interest among buyers, producers and public groups, which can be overcome if the marketing will be able to achieve four objectives: to maximize consumption, satisfaction consumer to consumer choice and quality of life. Maximization of desire seem to be any individual, the meaning of life is to satisfy the material and spiritual needs of the growing extent, and it reaches the consumer goods and services. Maximizing consumer satisfaction should reveal the qualitative side of goods and services. Assessing the level of satisfaction that produces good or service the consumer is difficult to do as there is no measuring, and people are influenced by many subjective factors in evaluating the degree of satisfaction of their needs. Maximize consumer choice implies that the variety of goods and services which would correspond to his wish to be huge, leading to increasing costs and prices, and the limited revenue opportunities and reduce the purchase may not be reaching the other objectives. Maximization quality of life concerns not

only the quantity, quality, availability and cost of material goods and services, but also the quality of the natural environment and cultural heritage. Quality of life is a complex concept but with different sense and while difficult to measure, but certainly a goal to which every person dreams.

We appreciate that the four objectives, which should satisfy the marketing system are closely interrelated and therefore should be empowered intelligence and combining effects to achieve maximize results.

7. MARKETING FUNCTIONS

If the definition of what marketing is still a range of views regarding the functions (function designates a group of activities based on a weighted key criterion, which gives a theoretical understanding of marketing), which it meets, noted consensus resulted in the systematization of the four functions:

- 1 - To investigate the market and consumer needs;
- 2 - Connecting the economic activity of the dynamic environment;
- 3 - To satisfy the conditions above needs of consumer;
- 4 - To maximize economic efficiency.

Marketing takes place in a global dynamic, vast and complex as a result of modern technology, the political and social changes that are reflected in the rapid globalization of the economy, the dynamics, but the emphasis and the social and ethical responsibilities incumbent firms and they can no longer ignore. Organizations that fail to integrate and respond favorably to these changes are threatening to stay behind or even disappear. They must continually adapt strategies, whereas changing environment leads to annulment of quality strategies that were successful yesterday and so it need more for tomorrow.

It is estimated that the effects of internationalization has the greatest impact on the business of marketing, as operations

require restructuring of marketing at the national level in order to compete internationally, which complicates the four P combination of traditional marketing mix.

8. CONCLUSIONS

Marketing and advertising are the pillars of the third millennium. The reality is the consumer and the consumer has the right to choose. We receive our products appropriate to the needs, we want to enjoy every minute used. Evolution has brought about transformation of the consumers. Today the marketing theories are very diverse. There are experts who say that the future belongs not marketing and advertising. Elitism but it does not take account of the public, the only one who can decide on this market. Advertising market has been in the last ten years a significant increase, because people need advertising to target. You can choose not to have more choices available, and advertising gives you that. People know how to choose, no one forcing them to do so. Handling the media is an illusion, found an excuse by many analysts who are unable to accept a record. Products failing to require the products are most popular with the public.

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KEY COMPETENCE OF MANAGERS

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Many theoretic from management show many approaches to keeper of work station in our case managers. We predict high value of intelligent quotient like intellectual skill too; this isn't key item for manager competence. In the base of practice we can allege that people with high intelligent quotient but lower emotional quotient have hindered skill us: competence to communicate with colleague. They are less suitable for work in team, which is necessary to determine requirements for keeper of work station in organization. In the base of requirements of work station we can measure adequacy of employee on work station eventually their next development for elimination of default.

I take decision to write this article "Key competence of manager".

Abstract: *Key competence of managers is in article worked like in theoretical and empiric part. In tendency of near key competence of managers we sector article in one theoretical chapter and one empirical chapter. The first chapter is about managers and their set – up in organization, characterize managerial nature, role and skills and define basic competences of managers. The second chapter is empiric part of article we near inquiry key competences of manager at Armed Forces Academy gen. M. R. Štefanika in Liptovsky Mikulas, which was made by enquiry oriented to key competence of manager. Conclusion of this article we evaluate key competence and its addition for chosen organization and application to improvement if there will be some vice.*

Keywords: *manager, key competence of manager, social post of competence, skill post of competence, knowledge post of competence.*

1. MANAGER LIKE MANAGEMENT MAKER

Manager is human, who dispose specific knowledge, skills and authority in charge of area [1] Position of manager is very attractive and attracts favor of higher counted people. We can not appreciate managers on their visual part, but it depends on their knowledge and skills and on the base of their using. "Managers create independent profession, where individual is nominated to realize active operative activities for those is fitted with competences. Manager is every leader, which is nominated, designed, selected on his function [2]."

Very important part of this definition is fact that manager is first of all profession. Holder of this profession is responsible for achieving target of organization, with utilize of employee cooperation. Manager have not to be dominant superior with army of sub, but

human with know to utilize knowledge and skills of colleague.

In management needs respect many effect of environment. Environments include powers which have influence for managers' activities. Management in organization is always in concrete conditions; on face on it the same problem has another solution in other organizations. Manager in solving problems have to come out from own experiential and recommending, which are attested, but we have to adapt this conditions in organization.

Sojka [1] defined role of manager like system of systematic contiguous and observable conduct, which is part of fixed profession.

Competence is idea, which is used like expression for necessary qualification, which is needed for proprietor of workstation. Competence - authority, possibility, reference, relevancy, qualification, specialized skills. Competences are not only specialized

knowledge which we obtain in study process in school, but there are ability and psychical skills, attitudes and attributes, which people bring to their life in “baby’s outfit” inbred wake of forefather.

SLEX 99 - Lexicon of Slovak language define competence like:

- Competence - ring activity, authority;
- Competent - This is competence, authority, qualified, responsible, and capable.

We can divide competence into:

- Key competence;
- Professional competence - is re-bound with concrete science and their encompassment make easier to give better output of their profession.

Key competence in Lisbon process is known like portable and multifunctional folder of knowledge, skills, attitudes and attributes, which everyone needs for personal development. Their encompassment should have to redound to higher flexibility of employee in wider. The base of these competences have to be acquisition in elementary school and this make the base for next and whole – life education. In area of Lisbon process [3]:

- Competence pertinent on concrete discipline (school - time): communication in native language, communication in foreign language, mathematical literacy and competence in sciences area and technologies, information and communication technologies;
- Cross-curricular competences: learn to learn, interpersonal, intercultural and social competences, civil competences, work competences, competences for solving problems, view of culture.

2. INQUIRY OF KEY COMPETENCE IN CHOSEN ORGANIZATION

For key competence we regard competence which serves description of behavior which is important for all employees. Key competence support organization culture, organization value and to expectant output.

Key competences are different in every organization, because every organization considers for key something another. Many countries of the world present system of key’s

competencies, which try to realized whole – life education, especially in schools and in employ, or in media, too.

On this base were realized inquiry in 500 successfully organization which are the most important skills for employee needed in 21 century. It was following competencies - team work, solving problems, interpersonal skills, communication, listening, personal development and career development, leadership, motivation and giving targets, writing and organization development.

For specification of key competencies system it is important to develop methods for estimate this system and make research to find important knowledge, attributes, skills and value system. This research made by OECD states in perspective needs of Slovak republic suggest these categories:

- Cognitive category - solving problems, critical thinking, creativity;
- Interpersonal (social) category - effective work and living with another people, planning, organization and control of team activities, solving conflict;
- Informational category - information and computer literacy;
- Educational category - motivation for self-development and education, educational skills;
- Communication category - verbal, making writing materials like reading with understanding;
- Personal category - self - realization and self - control.

On the base aforementioned was realized following inquiry of chosen key competencies of managers in educational institution – Armed Forces Academy general M.R. Štefánika for purpose to know requirement on workstation.

Theme of inquiry is problem of effective communication like based premise of managerial competencies. Object of inquiry is Armed Forces Academy gen. M.R. Štefánika in Liptovský Mikuláš, which is assumed effective using of managerial competencies. Inquiry was made in sample of 50 people who are working in Armed Forces Academy gen. M.R. Štefánika. Return of enquiry was relatively high (40 respondents from 50). Main scope of this inquiry is get information about nowadays key’s competencies of manager in

organization and make summary and recommendation to effective development, like to know that communication and other component of key competencies in organization.

Partial scopes of this inquiry are:

- To know that in organization is effective communication to sub;
- To know what level is communication skills of line manager and middle manager;
- To know on what level is knowledge pillar of competence in organization;
- To know on what level is social pillar of competence in organization.

Methodology of inquiry is based on giving question to respondent in enquiry. Enquiry is folder of ordered questions which we gave in written form. Enquiry has introduction and two parts.

In introduction is giving information to respondents who made inquiry, why and what is scope of inquiry. We are giving information about anonymity and thanks for cooperation and rules to fill enquiry.

In the first part are identification data about respondent (age, parentage, and workstation).

We divide the second part into three subparts. The first subpart is oriented on personal pillar of managerial competences. It's divided into two areas: on communication area and area of responsibility and self – activity. This area contents questions about object and scopes of inquiry. This part has 20 questions. The second subpart is oriented to social pillar of managerial competences. It's divided into two areas: area about stress and the second area are about image and personality traits. This part has eight questions.

The third subpart is oriented on knowledge pillar of managerial competences and is divided into area of application educational methods and methods of organization. This part contents 14 questions.

Interpretation of enquiry were made by mathematic and statistics methods.

Determined indication from enquiry we can interpret on the theoretical base. Interpretation is made by graphs and by word descriptions about known indication.

Average age of respondent was 41,9 years. On inquiry participle 11 line managers, 19

middle managers and 10 top managers.

3. RESULTS OF ENQUIRY

On the base of enquiry in Armed Forces of gen. M. R. Štefánik on the sample 50 people we can allege:

Proficiency pillar in this organization is on higher level. For employee development we recommended courses with fixation to administrative and correspondence work, courses of assertively and self - control.

We need work in team. For cooperation is needed to fix in recruitment to people, which are oriented to team work. We can test emotional quotient, because we find out availability for cooperation. We can tell that the higher EQ, that people is oriented to cooperation and work in team.

Social pillar of competence demand high putting of employee in this organization in term of concentration to work task, steadiness, and possibility to work in stress. On the base of enquiry we know these characteristics attribute, which manager could have: responsibility, veracity, communicativeness, justice, decisiveness, responsibility to organization, sincerity, empathy, assertively, resolution, discipline and strong personality and authority.

We can make good image like manager in these case: don't lie, do what I say, science, communication, positive thinking, a fair play, character, style of dressing, knowing etiquette and good look.

Knowledge pillar of competence is on very good level. We recommend next education by courses. In each work station they use logical thinking, self-development, flexibility and classified and structuring of work task.

We can allege that in this organization is communication in high level and knowledge pillar and social pillar in good level. By enquiry we permit make good model for specification of request of employee.

4. CONCLUSIONS

In European politics of education is point out to people which will be responsible for their education and professional preparing, but

for keeping knowledge during whole working life, too.

Tempo of changes in many aspects of work and work environment support general skill to education. Competencies of qualification and knowledge of each other in base for development in commons of informational participation to democraton – it is about what I need to know, what I need to learn and what I have to improve in my work station.

Competencies are base premise of competitiveness of organization. Competent worker can perform terms which resulting from work station specification. If we know level of competence we can know quality of human behavior in his work context.

Key competence is good tools for description of behavior. These competencies support to firm culture and organization value. It is the bases for making criteria of choose workers in organization.

Following this we can predict, that organization, which was object of enquiry, has competence workers, but we recommended small upgrading. Next education in organization is necessary premise of human resources development. My recommending for

organization was to sending employee in courses intent on development those competencies which are in lower level and they need it to development.

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THE CAREER AS THE FULFILLMENT OF VOCATION

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Abstract: *Vocation, as an internal force of personality, is accomplished through the choice of a profession, which represents a mean of self-fulfillment for the individual. Lack of correspondence between vocation and profession can lead to failure to adapt and lack of satisfaction, thus, disturbing the balance of one's personality. Young people's career choices are based on extrinsic factors (work place stability, salary, social prestige), yet, the role of aptitude or talent is not to be ignored when choosing and pursuing a career.*

Key words: *profession, vocation, vocational conflict, failure to adapt.*

1. THE NEED FOR SELF ACCOMPLISHMENT THROUGH CAREER

From a social perspective, the inner force of the vocation may be fulfilled through career. In this context, the vocation implies the "preferred professional activity which, in its whole substance, corresponds to the inner model of the individual" [1]. In reality, the following situation become distinct:

1. **The ideal or desired situation**, is that in which the vocational integration is achieved, which means that the vocation and the career coincide. The superposition of one's career over the personal "model" leads to an absolute engagement of the individual into his or her professional activity, with both a maximum efficiency and the joy of satisfactions.

Which are the prerequisites for this ideal to be accomplished? When the option is the result of a personal decision, based on an authentic self-knowledge, the chances for the option to be close to the vocation are increased. Consequently, the self-knowledge, the self- image, based on which the individual projects himself or herself into the future, play a decisive role. Thus, the career does no longer represent merely a means of ensuring the subsistence, but also the fulfillment of personality, which identifies with the career. Therefore, the vocational correspondence

becomes a source of satisfaction and equilibrium. The optimal integration within the professional role leads to a maximum of equilibrium, satisfactions and high aspirations. In this case, the professional role fully satisfies the need for affirmation, creation, self-esteem and prestige. Whereas the entire dynamics of personality is nothing more than the expression of the self-quest and self-assertion, we can state that the vocation represents the highest stage of its accomplishment.

2. **The situation of mismatch between the individual and his or her career** is situated at the opposite extreme. Jean-Jacques Rousseau, in his *Confessions* [2] revealed his own drama: Francueil, a general tax collector, a career that totally disgusted him, employed him. The moment when he resigned from this job, the author suffered from affective disorders and fell sick. The vocational mismatch may become a source of lack of balance for the human personality, it generating the following conditions: failure in adjustment, vocational conflict, vocational frustration, behavioral disorders and lack of school or professional success.

- *The failure in adjustment* is the effect of the incompatibility, disagreement, lack of correspondence between the individual and the selected career for which he or she is training or practices already. "The Ego wastes itself whenever it does not find a manner to fully

express itself" [3]. The failure in adjustment finally leads to a gradual disintegration of the Ego.

- *The vocational conflict* appears when the individual is simultaneously stressed by two incompatible requirements. Conflicts may be *inter-subjective* (between internal and external requirements or two external ones: school and family) or *intra-subjective* (when two internal requirements clash, between aptitudes and material interests). Finally, all inner conflicts (intra-subjective) are the expression of some inter-subjective conflicts. The vocational conflict is the conflict between the role played by the individual and his or her personality, convictions and aptitudes, in other words, between the external model (offered by the role) and the inner model (a configuration of his or her own personality). The professional activity may become a source for conflict since the individual tends to accomplish his or her external model (and play his/her social role as well as he/she can), but his or her interiority (aptitudes, abilities, interests) does not hold the capacity of molding on the external model, which gradually leads to exhaustion.

- *The vocational frustration* is tightly connected to the vocational conflict, they inducing reciprocally. The frustration is "*the physical state of dissatisfaction and feeling of futility, due to the subjective incapacity or the objective impossibility of achieving a certain goal*" [4]. Frustration has three components: a frustrating situation, a state of frustration and an answer to frustration. The blockage of the goals to be achieved, the deceit of expectations and the failures generate demobilizing feelings, resentments, physical tension and the loss of self-confidence. Any frustration represents a psychological stress and releases defending mechanisms of the Ego. Anger, fear and anxiety are forgotten or camouflaged by two behavioral manifestations: fantasy and compensation. Fantasy leads to the accomplishment of the frustrated desires through imagination, while compensation consists of hiding the weakness by the over-accomplishment of another desire. The research in this respect (L.F.Shaffer, E.J.Shaben, 1956), show that the majority of the investigated subjects used to have fantasies

about vocational successes. In case of compensation, the subject adopts a type of behavior that creates the illusion of success. For example, a young woman who had failed the entrance examination to the Theater and Film Academy started a career in Physical Education, imagining a kind of theater acting in performing physical exercises. Other manners to answer the vocational frustration are the aggressiveness and the indifference. Even though frustration and the vocational conflict do not always become manifest, they manage to destabilize the human personality, negatively influencing his/her social and professional integration.

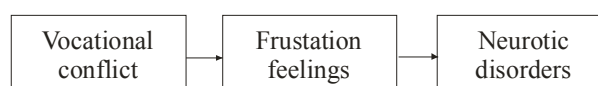


Fig. 1 Psychological consequences of the vocational conflict

The destabilization of personality may be defined as an undermining of the mental health and the beginning of behavioral disorders: psychical instability, irascibility, revolt spirit, antisocial acts etc. this is the extreme limit of the vocational mismatch, able to shatter the very physical and psychical integrity of an individual. In between these two contrasting situations (positive and negative) described above, there lies a scale of various other instances, which may be found in reality and which express the relation between aspiration and vocation or, that type of behavior that is adopted by each of us, in relation with the self and own existence.

The level of aspiration in each individual is the result of both his/her inner structure and the models provided by society. Individual who become distinct may be grouped as follows:

a) *Subjects with an optimal vocational behavior*— characterized by a high aspiration-level, and by a permanent search for goals. These people are highly trained in their professional activity, which they see as a vital necessity, meant to be satisfied;

b) *The vocational marginal* - with fluctuating satisfactions and aspiration levels, yet who can be ascendingly trained via favorable mobiles;

c) *The indifferent* - who do not hold a professional ideal and look for their satisfactions in other activities than professional;

d) *The revolted* - the revolt appears in those subjects who are permanently dissatisfied and in conflict with the surrounding world and themselves.

2. THE ADOLESCENTS AND THE MILITARY CAREER

A major issue, which the unstable and insecure contemporary world brings to attention, is that of the professional insertion of young people. Starting from the premise that young people represent the most valuable treasure of a society, and the most valuable human resource of the future, the society cannot afford to neglect the professional insertion process, since such an omission might have devastating effects on a long and medium range terms. As the importance of professional orientation becomes more acute, the demand for compatibility between the professional training and the dynamics of the labor market increases. The orientation and directions of economic policies, of social protection, education and training must take into account the profound mutations, which the contemporary society faces, and diminish the perturbations and the dysfunctions with destabilizing, negative effect over the young people. Besides the social losses, caused by a deficient valorization of the human potential of thinking and acting, we witness dysfunctions in the socializing process of young people, a damaging of the social integration process and a manifestation of frustration phenomena and disordered behaviors. A portrait of the socio-professionally-not-integrated young person would very suggestive: the lack of accomplishment of his human and professional aspirations may lead to the formation of an altered self-perception. The young person may feel like an outcast, futile, disoriented, pushed towards a very unsafe lifestyle, forced to accept black market labor offers. Out of these, we obtain a distorted personality, unable to engage into life or professional projects.

Peter Grootings [5], the coordinator of a

study on young people, under the European Center for Research and Documentation Coordination in Social Sciences from Vienna, observes the existence of a mismatch between the qualifications, expectations and aspirations of young people and the realities of the contemporary labor market's demands. In other words, a mismatch between the education products and the demands of the labor market. Among the most serious outcomes of this mismatch are the unemployment and the underemployment (the employment of young people with high qualifications in positions requiring inferior qualifications). The underemployment, in turn, highlights another negative phenomenon: the super-education of new generations, who represent the stored educational product, unable to find an adequate and complete use on the labor market" [6].

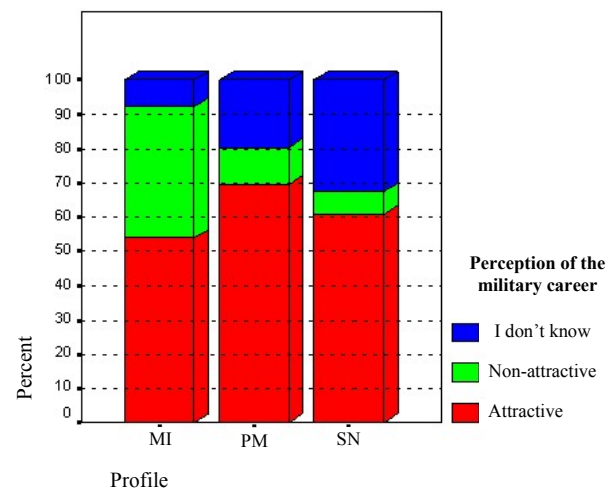


Fig. 2 Perception of the military career

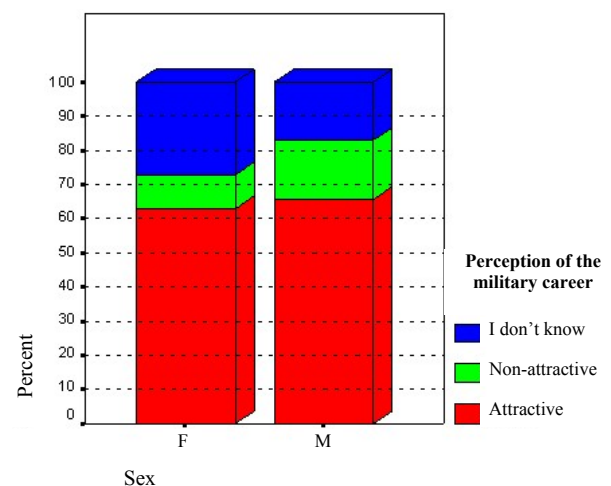


Fig. 3 Perception of the military career

The present study was achieved on a sample of 105 adolescents, aged between 18-19, pupils in their twelfth grade, at a national college from Brasov.

When asked about their perception of the military career in the actual context of the labor market offers, 50% of the interviewed appreciated it as attractive.

Nevertheless, when declaring their real professional option, at the end of their studies, the young people's choices were tightly connected to the specialization provided by the highschool they were about to graduate, which means that the school option of each of them had been made at the very beginning of their highschool entrance.

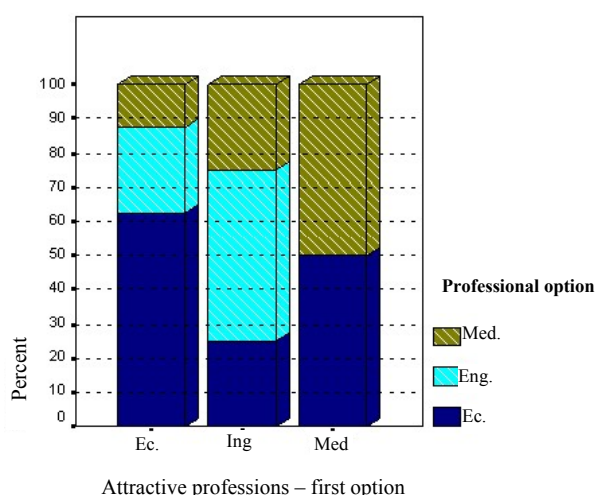


Fig. 4 Professional option

Thus, those attending the courses of the Mathematics - Computer Sciences (MI) profile, opted for the economist career (62%), those attending the specialization Environment Protection (PM) chose the engineering career (50%), and those attending the Nature Sciences (SN) specialization selected the medical career (50%).

The remaining young people, still undecided, considered the military career as a possible option. In this context, the attractiveness of the military career is related to rather a positive stereotype, describing the military institution, while the career selection is made based on extrinsic motivations consisting of: the safety of the workplace, payment and social prestige.

The characterization of the army in three words (first option)

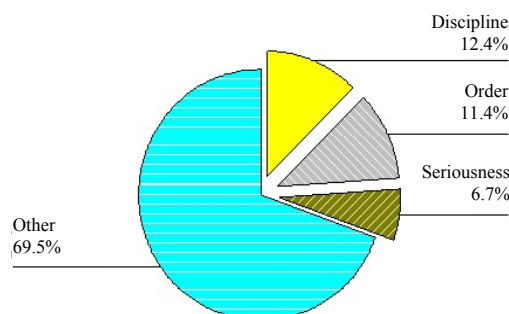


Fig. 5 The characterization of the army in three words

The attractiveness elements of the military career (first option)

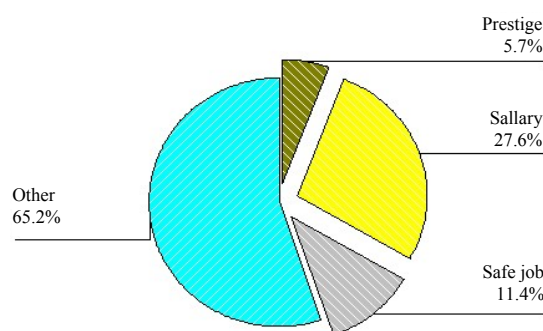


Fig. 6 The attractiveness elements of the military career

However, young people considered that aptitudes were very important in selecting and practicing of a career. 55% of the questioned subjects placed aptitudes on a very high rank. The career selection at graduation from the highschool was conditioned by and based on aptitudes for 64.8% of the subjects and on an extrinsic motivation for the remaining.



Fig. 7 Motivation in selecting a career

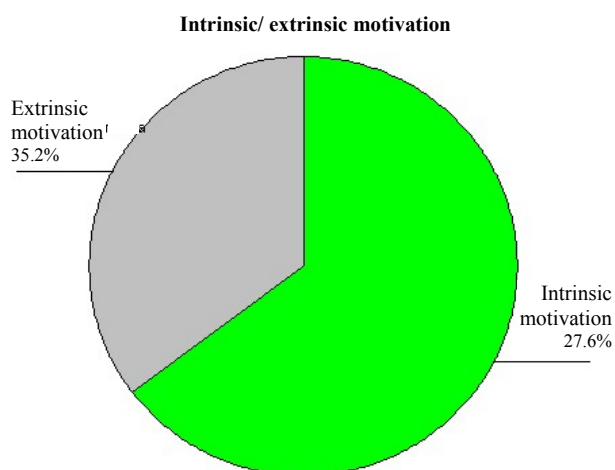


Fig. 8 Intrinsic/extrinsic motivation

Although the results of the study cannot be extrapolated over a larger population due to the reduced size of the sample, the following conclusion may result:

1. The social perception of the adolescent over the military institution and profession is tightly connected to the existence of a positive stereotype in the social space, and it is not based on knowledge of the real characteristics of the military career, with its challenges and minuses.

2. The school option, in case of highschool studies, is made from the perspective of selecting a future career, due to a large spectrum of offers provided by the educational system.

3. The pragmatism of the society and the dynamics of the socio-professional structures

force the young people to select a career able to offer them stability and good material gains. However, the awareness of the necessity of aptitudes in selecting and practicing a career and implicitly in self-accomplishment mirrors the fact that this generally human necessity - the need of self-accomplishment - cannot be neglected.

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THE ROLE OF INTERPERSONAL COMMUNICATION IN CAREER COUNSELING FOR STUDENTS

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Abstract: *The relationship between career counseling (C.C) and interpersonal communication (C.I.) represents a new conceptual attitude concerning the implementation of psycho-social strategies which can respond to certain commands of conjuncture. Thus, professional accomplishment represents for student represent the sine qua non condition to report to society, proving his own capacities of adaptation and success, starting from the logistics of vocational career. The intervention on time of counseling in career also supposes interpersonal communication, which facilitates the duality of success taking in consideration: the time, the goal and the cause.*

Key words: *interpersonal communication, counseling,*

If we start our incursion from E. Sabato's words: "*We never manage to communicate properly. It's like shouting one at another from different islands*" then we will easily discover that we have a serious problem of communication that needs to be solved immediately, with both ourselves and the people that surround us. What is the best solution? Laurențiu Fulga reacts to these quotes with a precise accusation regarding our ignorance "*Asking questions of high importance*", leading to an inevitable awakening of the nation.

Thus, in more practical terms we can evoke the existence of a relationship which is established within the context of implementing strategies to address psychosocial short order, namely the biunivoque sequence between career counseling (which will be noted as C.C. during this essay) and interpersonal communication (which we will note as C.I. in this essay). These two items complete one another, resulting in this form:

C.C. \longleftrightarrow C.I.

decoding the conceptual and structural situation.

Starting from this point on we can establish that in specialized literature, Pasca M.D. and Tia T. (2007), guidance is a unique way of interpersonal communication based on mutual

trust, honesty and willingness, born of the desire to assist another human being and it manages a transfer of experience and responsibility for the one in need, by providing a spontaneous and simulating pieces of advice.

In other words, counseling is a process of communication with interactive and permissive character, which provides guidance in matters that outrun the competence of the person to whom they are addressed.

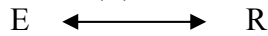
When talking about carrer giudance (CC), Lemeni G. and Miclea M. (2004) follow the development of skills as a possible solution to all career issues (indecision, anxiety related with career, academic insatisfaction, career planning etc.), which is considered to be the essence of psychological intervention. We can decode the C.C. strategy (career counseling) through logistics:

- Who is involved and who provides expectations?
- Where does it take place (location)?
- When is it implemented?
- How is it structured in order to respond to the requested items?
- What's the purpose?
- For how long is it allocated?
- What is the motivation?

using the result as a tool for decoding positive/ negative responses given by our

client in a situation created as a result of our attitude.

Considering the relationship established between the emitter (E) and receiver (R)



as being the structural element of our motivation, we can conclude by saying that interpersonal communication (C.I.) is vital in career guidance because it triggers another report of cognitive features which intend to shape a new attitude and a more positive view when it comes to:

- the subject of labor and employment;
- professional involvement;
- the successful training of labor;
- personal satisfaction;
- cap, monotony;
- frustration;
- refusal / failure;
- dissatisfactions / instability;

the list could continue in order to separate the reference group and to influence its educational and psychological characteristics, knowing its age particularities. But until then, it is necessary to determine the features of communication starting from N. Stanton (1995) which always seeks four main objectives:

- to be heard;
- to be understood;
- to be accepted;
- to cause a reaction (a change in behaviour or attitude).

In the structural limitations, E. La Monea (1994) - by Lupu I., Zanc I., Săndulescu C. (2004), which holds nine goals, whether alone or combined with each other, can be found in any process of communication like:

- to study, to transmit and receive knowledge;
- to influence people's behaviour;
- to express feelings;
- to explain and understand our own behaviour and others reaction;
- to maintain connections with the ones who surround you/to get integrated in the society;
- to clarify a problem;
- to achieve a goal;
- to reduce tensions and resolve conflict;
- to stimulate their interests or those around them.

Another feature of interpersonal communication (C.I.) is highlighted by Lemeni

G. and M. Miclea (2004) who state that communication is defined as the process which transmits pieces of information from a transmitter to a receiver using a system based on signs and symbols. The same authors state that the effectiveness of communication depends on the existence of these skills:

- active listening - the ability to emphasize both the content of the message and emotions in order to ensure the most accurate understanding of the message;
- the exact transmission of the message;
- identifying conflict sources and using specific strategies to solve conflicts.

We will also stress out the strategy of interpersonal communication (C.I.) starting from the following questions:

- Who are those who communicate?
- Who is it addressed to?
- Where does communication take place?
- Where does communication take place?
- Why does this take place?
- For how long does communication last?
- What is the motivation?

noticing that the two entities have common features which simplify their interaction.

What implements interpersonal communication (CI) as a medium of knowledge, is the stated communication (CA), Holdevici I. (2000) is an attitude and a way to act in those situations where we need to express our feelings, to claim our rights and say „no” when we are not willing to do a certain thing.

In connection with this idea we must relate the resultant of stated communication (CA), the stated behaviour, knowing that the author believes this holds the middle position between two extremes: aggression and submission, so it's really important for everybody to understand that we are entitled to ask what we wish, respecting their own rights as it does for those around them. At this level:

- the issue is taken into consideration;
- your rights are sustained;
- you choose your own line of work;
- you have complete confidence in yourself;
- you recognise both your rights and others.

When discussing about stated behaviour (C.A.), Lemeni G. and Miclea M. (2004) underline that this:

- attends to the construction and development of personal and social identity and social, of efficient adapting (re)finding the mental, physical and emotional balance;
- promotes and maintains positive interpersonal relations by providing support for a constructive and amicable resolution of conflicts, practically statements facilitate solving tense interpersonal situations.

All of this have a strong effect upon the solutions of all career problems which have :

- time
 - location
 - shape
- } ⇒ own identity

conceiving and applying personalized strategies helping the subject in these particular situations:

1) at the end of primary school when he has to choose something(stimulated by his desire or by the people who surround him)-early teen age;

2) at the end of secondary school when all options are already counted, and students take into consideration the demand and supply on the market when deciding upon a certain university;

3) at the end of university when in order to gather professional fulfilment one must attend different courses: postgraduate, master, doctoral as means of specialising in certain fields;

But, in order to use the benefic results of interpersonal communication (CI) in career counseling (DC) vs. career counseling (DC) and interpersonal communication (CI) it is absolutely necessary to know the particular age of the subject, even his features, to act on future motivational characteristics of his social identity.

But before we look for all his age particularities it is compulsory to identify the age from these two points of view:

a) cronological - considered a variable constant, relatively egalitarian, for those born on the same date(it mainly refers to the year);

b) psychological - it doesn't concern only the complexity of personality in general but also the stratification and adaptive behaviour which allow adjustment forms and social contribution.

Şchiopu U. and Verza E. (1981) state that in order to analyse age particularities we have

to consider the criteria that establish the different stages of development of personality:

1. dominant undertaken activity;
2. the socio-cultural relations;
3. specific mental structures.

The same authors established a hierarchy of life cycles in the form:

a) the cycle of growth and development of the first 20 years of life, which in turn includes specific stages;

b) adult psychological cycle which extends up to 65 years, marking the period in which human personality engages in social and professional responsibilities;

c) age regression cycle (of old age), which extends from 65 years to death, which leads gradually to the final regression, also known as the terminal cycle.

We believe that in this case, along with the compartmenting above, Eriksan E. (MD Pasca after 2007) surprises in a particular way life cycle, and identifying particularities of life. So in this context, we will discuss upon:

1) teen age (identity - role confusion) - stage that coincides with adolescence, ie the age frenetic, but very troubled when, at the end of all bio-psychological storms that cross, the young man wants to know who became. That explains why at this stage, the crisis of identity and role confusion, it confuses him so frequently;

2) young adult (intimacy-isolation) - this sequence is dominated by the need of the individual to make basic social relationships constantly, but at the same time, to find a genuine partner of the opposite sex to populate his intimacy. Otherwise, he finds refuge in stressful situations without finding an optimal solution for the conflict that troubles him;

3) medium adult (career - the withdrawal itself) - refers to the age when the individual has to choose between two alternatives, one of toil in the future (in the new generation) in a variety of activities or to center his interest upon himself. At this state, the evolution stops;

4) old age (integrity-despair) - last ontogenetic stage is inevitably accompanied by an existential balance. When at the last inventory there are more achievements than failures, the individual seeks a happy sense of satisfaction and health. Conversely, if not, late

regrets and the fear of death, which becomes stronger, make people despair.

Thus, knowledge of bio-psychological identities of persons falling under the categories mentioned above, we can decode inter-relations between career communication (CC) and interpersonal communication (CI) at the strategies submitted to our attention.

The beneficial „cohabitation” between career advice (CC) and interpersonal communication (IC) is manifested especially in the university - where students included in the European system of education-Bologna, are forced, after the period of three years (in most situations) to continue their training courses in the form:

- a) MA (2 years);
- b) Postgraduate (6 months-1 year);
- c) Doctoral schools (4 years).

which implies a new attitude towards lifelong learning/continuing included in adult education.

However, after the 1996 UNESCO report scored four foundations and directions for the XXI century to the students and the universities, namely:

a) learn to know - to know the reality of the past, present or virtual, learning to teach permanently, to emphasize the cultural values that exist at a certain time;

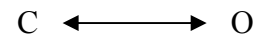
b) learn to do - to learn to deal reaching a pragmatic skill in a given horizon of activity, learning to cope with diverse and complex social situations in which you tend to integrate;

c) learn to live together - to be permissive and care one for another, to be receptive and value your ideals, to achieve joint projects and be ready to manage any conflicts while respecting the values of pluralism, of the mutual understanding and peace;

d) learn to be - to value your personality, to become capable of providing your own judgement, to create all along, to live through values, to spread and amplify them through through your own acts.

We can foresee the need of interpersonal communication (CI) in the career counseling (DC) as graduate students bound for professional achievement by a way of specialization required in some situations by

the actual labor market, the society as a form of supply and demand:



transforming these words into:

- request - to give, to offer;
- supply - to receive, to do.

This is perhaps the point at which one form or another, the student needs to find a proper specialization, but also a way of achieving, to know whether the situation in which he lies is a problem or not and how it can be resolved, involving direct interpersonal communication (CI). At this point, career advice (CC) should be involved modular, helping students in resolving the issue that really boils down to:

- What specialty should I choose?
- How would I know I did wrong? / I made the right choice?
- Where should I ask for clarification?
- When is the best time to know all about this?
- Why do I need information?
- Who can help / advise me?

which competes in terms of the methodology with:

- defining clearly the student's problem;
- drawing up possible alternative solutions;
- choosing an alternative and practical implementation.

Thus, we are ensured with special assistance, through steps, Băban A. (2001) as following:

a) defining the problem - settling the problem and its form;

b) describing the problems - behavioral, cognitive and emotional problems;

c) identifying possible factors which develop the problem - this is a necessary stage in its elimination;

d) identifying the factors responsible for maintaining and activating problems - prevents the formation of appropriate attitudes and skills effectively;

e) the intervention plan includes all ways of achieving the objectives of the intervention; plan formulation stages are:

- the formulation of long-term objectives;
- the formulation of goals;
- intervention strategies;

f) intervention assessment - amends knowledge, attitudes and skill.

Considering our paper, the same author, Băban A. (by Pașca M.D. - 2007) constitutes the specific operations involved in the process of solving problems, namely:

a) finding alternatives - the ability to generate alternative multiple solutions, overcoming stereotypes and rigid beliefs which state that a problem has an unique and ideal solution;

b) forward thinking - the ability to anticipate the long and short term consequences of some situations;

c) planned approach - the ability to plan ahead a series of specific actions to implement a certain solution causing a positive approach forcing students to see themselves as capable persons who can solve their problems and take responsibility for solving them.

Considering the problem under these auspices, the student will know to choose which master it meets both his material and spiritual needs, succeeding in a short time to be involved in community-by finding that role, and social position, which he wanted, now being able to have it. But, there are situations in which in order to get here, the student needs counseling and communication, vanquishing in the end. In other words, he needs our help.

Very fit in this context, as a flexible way of understanding and accepting change we can invoke the therapeutic story - Give him your hand - Peseschkian N. (2005):

A man had sinked in a swamp in the northern part of Persia. Only his head was out of the gutter. He was shouting for help. Soon many people gathered at the around him. One decided to save the poor man. "Give me your hand, he screamed. I will get you out of the swamp". But the one covered in mud just continued to call for help and refused to be helped. "Give me your hand," the man asked several times. But the answer was always just a pathetic cry for help. At a certain moment, someone told the man: "He will never give you his hand. You have to give him your hand. This is the only way you can save him".

And nothing will harm the personality of the graduate student, eager to achieve professionalism and why shouldn't we admit

that if we stand by our students when they come to a crossroad it's like giving him out hand. We started our incursion with whether, and now, when we have to end it, we come to realize how important it is to "see the closet and not the drawers" or "the forest and not the tree" meaning that, as Gary Sinise said "When I think about work, I think in particular about the possibility of having control over your own destiny and not wait for "faith's mercy" which shows that career advice (CC) and interpersonal communication (CI) have at one time, a common route finished with a role and a social position for each one of us.

And if Mihai Ralea stated that „Each man has to have a time to listen to his soul” we can paraphrase him and say: We all have our time for counseling and communication but it's important to find it, to hear it and especially to „listen” to it, and we can finally consider that out intercession has reached its purpose if turning into then.

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INFORMATICS SYSTEMS IN MODERN MANAGEMENT

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***Abstract:** Informatics systems play an important role in modern organisations. Their existence may represent an important coercion for organisations. Appears a constant rise of interdependence between strategies, rules, procedures and the informatics systems consist of computer programmes, data bases and telecommunications equipment. A change in any of these components leads often to significant alteration of the others. This relation becomes critical when the organisation’s management realise long and medium term panning.*

***Keywords:** information, informatics system, management, decisions.*

1. INFORMATICS SYSTEMS - COMPONENTS OF THE INFORMATIONAL SYSTEM

Informational systems based on computers technologies use are named, in European terminology, informatics systems and they represent the ensemble of connected equipments, working together, using specific techniques and procedures to collect, stock and disseminate information, with the view of sustaining the decision taken process, coordination, control, analyze and monitoring organizational activities [2]. The American vocabulary uses the term Management Information System.

Computers technologies increased the data processing speed, enlarged the stocking capacities and realized better printing methods, so the managers are often flooded by data. Information is the basic material for management [1]. An efficient decisional and operational process realized by using the information is necessary to respect several quality criteria: to be timely, clear, complete, exact and relevant.

Information may be grouped in three categories, based on information type necessary for managers: information for strategic planning, information for managerial control and operational information.

Information for strategic planning refers to strategic management’s tasks to decide about the organization’s strategic objectives and about how those will be realized, including the acquisitions politics and resources utilizations.

Information necessary in executing manager’s coordination and control functions helps them to initiate the actions which better contribute to organization’s interest achievement. Three types of main information specific to coordination and control may be identified: information about costs on responsibility centers (profit), information about direct costs of projects and complete costs of project. The information for managerial coordination and control are interdepartmental, proceeding form different segments of the organization.

Operational information is tied to organization’s daily activities and contribute efficient to the specific tasks. They content mainly routine information about production, accounting, payment, human resources, logistics and equipment evidence. Operational information may be well definite and easy to reduce to a series of routine instructions, strategically information is difficult to define and those of coordination and control are situated between as level of definition.

Cleary definite information can be reduced to series of written instructions, so they can

be programmed. Programming informatics systems consists of defining specific elements, which stand without modifications and can be used for different combinations and calculations. Information for strategic planning is more difficult to program, but the new achievements in computers domain and computers programmes reduced considerably that effort.

The managers have clear options: they learn the base concepts in informatics domain or they delegate those responsibilities to the IT experts in projecting informatics systems. Yet, the second way is deficitary because of the difficulty to understand managers' informational needs and the informatics system realized by experts may not correspond to those needs.

2. INFORMATICS SYSTEMS TYPES

The new managerial strategies based on implementation of informatics systems may realise profound changes in organisation's structure and working. From among these changes the most important are: documents flux organisation (with costs reduction by replacing the paper and routine activities with electronically medium), increase of organisations flexibility, decrease of distances in many organisations, appearance of the virtual organisations, electronic commerce (interorganisational informatics systems, creating in this way an electronic market).

To construct, operate and maintain in function the informatics systems are daily problems for the managers. The most important problems for the organizations' leaders are the necessity of changes produced at the strategic level of the company and the informatics architecture of the organisation.

The necessity of changes produced at the strategic level of the company must be carefully analysed because the investments in information technologies have an important part in annual expenses of the organisation. The calculation power of the computers increased faster like the abilities of workers to use this technology. In order that organisation remain competitive they needed a reorganisation and reprojection. Organisations

are forced to use informational technology to simplify communication and control, eliminating in this way not necessary activities. To sell their products abroad firms should be part in multinational integrated informatics systems.

Informatical structure of the enterprise has major influence in development of its activities. Also, by connecting equipments in strong communication networks, major changes may appear at the organisational level, like: social relations rearranging, in offices and at the employees working places, changes of the reporting models and redefining the businesses objectives. By informatical architecture we understand the way how the data and processes of data analyse are centralised and distributed, including the mode of integrating data and their analyse. The systems are operated by technical personal, but the organisation's management must decide the proportion of funds allocated for hardware, software and telecommunications equipment acquisition. A good construction of the infrastructure may determinate later the identification of optimal solution for the informatics system.

The organisations have informatics systems for every of its functions and for every level of its operational management, tactic, knowledge level and strategic management.

Informatics systems can be differentiating considering firm's functions. The main functions are: research and development, production, commercial (sales and marketing), finances-accounting and human resources. Any of these functions have it own informatics system. Commercial function, generally, has a selling system at operational level, used to register the daily volume of sales and to process the orders, a system at knowledge level, projected to promote firm's products, another one at the tactic level, to supervise the monthly volume of sales depending of different market segments where the firm's products are saled, and a system at strategic level to analyse prognoses of sales and to identify the main tendencies of sales on long term [3].

Reported to the four levels of the organization appeared six types of informatics

systems, with an essential role in organization's achievement of planned objectives. The systems are:

- Executive Support Systems (ESS)
- Management Information Systems (MIS)
- Decision Support Systems (DSS)
- Knowledge Work Systems (KWS)
- Office Automation Systems (OAS)
- Transaction Processing Systems (TPS)

Every level system is specialized to serve each of the functional subdivision of an organisation. The main features of information processing systems are shown in table 1. [2]

TPS can be found at the operational level of an organisation.

That type of system is characterized by daily executing or accomplishing the ordinary transactions typical of the business run by the organisations.

Table 1 Features of information processing systems

System type	Input data	Processing	Output data	Users
ESS	Aggregated (internal, external) data	Graphics, simulations interactive processing	Analyses, projections, question replies	High level (strategic) managers
DSS	Analytic models, TPS, MIS and KWS data	Processing by analysis models	Special reports, decisional analyses, questions replies	Professionals leadership personnel
MIS	Data (TPS, KWS), information on transactions easy models	Routine processing easy models, partial analyses	Reports, synthetic situations	Medium level (tactic) managers
KWS	Indications for projection, knowledge bases	Modelling, simulations	Graphic models, projects, drafts	Professionals technical staff
OAS	Documents, primary data, including video and audio data	Document processing, planning, communications	Document s plans, mail, electronic mail, messages	Clerks
TPS	Primary data relate to transactions	Sorting, listing, merging, updating	Detailed reports, lists, summaries synthetic situation	Operating personnel, monitoring

TPS are specialized in taking, stoking and prelucrate data corresponding to daily, routine, transactions, assuring current actualisation of database.

MIS are used at the organisation's management level and used for the planning functions, control and decisions taken by supplying periodical synthesizing reports or express reports according to circumstances. These systems are orientated to reports and control, disposing of reduced analytic capacities, are relative inflexible and based on existing data flux. MIS are dependent of TPS because TPS provide the necessary data.

DSS are informatics systems that combine the available data and information according to some complex analysis models in order to assist an organisation's management in the decision-making process (programmed, semi structured or unstructured). DSS utilise internal information provided by TPS and MIS, but it often access external sources of information (fiscal rules, the cost of the capital in different sources of founds, prices from competition). DSS allow to their users to initiate and control the input and output data. DSS may operate with minimum assistance from programmers.

Table 2 Correlations between types of decisions and informatics systems types

Organizational level			
Strategic level			ESS
Tactic level	MIS		DSS
Knowledge level	OAS		
Operational level	TPS		
Type of decisions	Programmed	Semi structured	Unstructured

Decision Support Systems are characterized by flexibility, adaptability and a quickly answering. These systems use sophisticated instruments to modelate and analyse data.

KWS helps specialists (engineers, doctors, scientists) to create and integrate new knowledge within the organization.

OAS ensures communication with clients, suppliers, and other partner organisations. The

main applications specific to this type of informatics systems are: text processors, table processors, presentation creating systems, communication software for Internet and teleconferences, image processing systems and the applications in planning office activities.

Informatics systems that offer assistance in administration of business portfolio, Executive Support Systems, operate at the strategic level of the organisation. ESS is projected by incorporated data referring at external events, but it obtains also information from organisation's internal systems, MIS and DSS. ESS filter, compress and study the important data for organisation by reducing the time and effort necessary for obtaining the information used by organisation's leaders.

3. CONCLUSIONS

Informatics systems may become strong instruments for organisation's competitiveness and efficiency.

Managers consider information as a strategic resource, like capital and work factor.

The efficiency of manager's actions depends on the quality of information used in decision-making. Thus, if the information is incomplete or delayed, the decisional process is affected and the manager's actions may lead to results that were not wanted. Information Technology may be used to reproject and modelate organisations, to transform their structure, their mechanisms of report and control, the documents flux, the way how products and services are realized.

Organisations have Informatics Systems for every of their functions and for every level of their management, operational, tactic, knowledge level and strategic level. These systems don't function isolated. Between them exists a system of relations which determinate multiple interactions.

Projecting and developing the informatics systems of the organisation is a difficult problem, systems integration necessitate funds and time. Every organisation, based on its financial possibilities and advantages, could decide the optimal degree of systems integration.

All types of Informatics Systems are valuable because it support the organisation to solve their problems and to obtain advantages on competition.

Informatics Systems used in modern management are strong instruments, strategic informatics systems, which allowed to the organisations to survive in a difficult time and to progress and develop.

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TEACHING *HOW* TO LISTEN

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Abstract: *In this article, I argue that the more conventional way of handling listening is not the most efficient. Instead of audio recordings, I would recommend the use of video as it allows teachers to familiarize learners with various strategies that will assist them in becoming competent listeners.*

Keywords: *listening comprehension, strategies, extralinguistic and paralinguistic signals, video file.*

1. LISTENING ACTIVITIES SHOULD TEACH, NOT TEST

Teaching students how to become competent listeners is an arduous task. One might argue that such a declaratory statement is anachronistic, rather echoing the language teacher of the 60's and 70's, when the tape recorders and language laboratories were inexistent, and the methodology was still in its infancy. Indeed, nowadays listening materials are no longer a hard commodity to find, and there is a whole literature to resort to. But do they actually teach learners *how* to listen? This question resonates with me personally. There is nothing more discouraging for a language teacher like myself than to be met with the blank stares of some of my students (lower - intermediate and above) when directing a feedback listening session. The reason?

The conventional way of handling listening comprehension consists of listening to a dialogue / report / passage in conjunction with a set of activities (ranging from overall to detailed comprehension). In fact, students are not taught how to tackle the piece of listening: they are not trained in using strategies, but rather "tested" (let's face it: how many times, in a real life situation, have we been in the position of listening to someone for a minute and try to retain five pieces of information?). I am not suggesting that there is no value to this "test - retest" approach, which would prove

useful, for instance, in the context of a listening examination. But if the ultimate purpose of studying a foreign language is to communicate in a real life situation, shouldn't we also bear in mind how listening takes place in the real world and tailor our teaching methods and materials accordingly?

2. WHAT REAL LISTENING IS ALL ABOUT

For answers on teaching *how* to listen I turned to David J. Mendelsohn, the author of *Learning to Listen: A Strategy - Based Approach for the Second - Language Learner*. In his book, Mendelsohn cites a comprehensive definition of listening in the first language given by O'Malley, Chamot and Kupper, which I shall use as a starting point in my line of argument:

Listening comprehension is an active and conscious process in which the listener constructs meaning by using cues (extralinguistic, paralinguistic, and lexical) from contextual information and from existing knowledge, while relying upon multiple strategic resources to fulfill the task requirements.

To illustrate these abstract ideas, I would like to give an example:

One morning, you are called to your superior's office without having been informed on the reason. As you enter the office, you are greeted with a grumpy tone of voice and a

frowning expression. On your superior's desk, you recognize your handwritten report.

Before you even have the chance to listen to what your superior has to say, your brain will have been invaded with a wealth of information which is processed in a trice: your superior is angry with you (use of paralinguistic signals: the frown and the tone of voice) because of your report (use of extralinguistic / environmental clues: the report you saw on the desk) which is probably poorly conceived (link to your existing world of knowledge: the deadline was very tight and so you did not have sufficient time to include all the required information). At this stage, your brain anticipates (use of strategy: hypothesis formation) that you are about to be reprimanded. And while listening to your superior's words, you will, in fact, either validate or modify this prediction.

The importance of hypothesis formation in the listening process cannot be understated. Unfortunately, in the more artificial medium of audio recording, this is facilitated by means of a warm up activity directed by the teacher. But how can this stage be achieved in a manner that is closer to reality, so as not to sacrifice any of the contextual clues? The answer: *the video file*.

3. ADVOCATING FOR THE VIDEO FILE AND THE TEACHING OF LISTENING STRATEGIES

Drawing the learners' attention to the extralinguistic and paralinguistic signals while watching a video (ideally, three-minute long) with the sound off will assist them in determining the setting (*where* and *when*), the interpersonal relationship between the speakers (*who*), and the topic (*what* and *why*), thus enhancing the chances of successful hypothesis formation. Furthermore, a video permits training in recognizing and

interpreting the linguistic signals, such as the primary sentence stress, which is instrumental in ascertaining the main idea of what is being listened to. This is only possible when the stress / unstress is natural (in audio recordings words are too clearly enunciated, and the delivery is unnaturally slow causing learners to give equal attention to all parts of a listening passage). Learners should also be taught how to cope with the special features of spoken English and how they relate to imparting meaning. Such features are the *fast speech rules* (short forms, deletion of sound segments, abandoned half sentences, hesitation phenomena, repetition, empty verbal fillers), which, unfortunately, are carefully edited out of audio recordings. Full listening comprehension also relies on recognition and interpretation of discourse markers, which tell learners what the logical relation between utterances is. In addition to all these, learners should be made aware that the same string of words can mean a number of different things depending on the circumstances under which they are said.

All of the above mentioned points on strategy training and the advantages of the video over the recording suggest that listening can and should be approached in a more efficient way. Teaching learners how to best make use of both the lexical and non-lexical signals in second – language listening is not so much a matter of teaching them new strategies. It is more a question of causing them to transfer what they do quite naturally in their mother tongue into the second language.

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EXPLANATIONS OF FINANCIAL CRISES IN THE CLASSIC THEORY AND IN THE THEORY OF REFLEXIVITY

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***Abstract:** Financial markets and economic activity suffered severe crisis from 2008 which made necessary to review the underling economic theory and to analyse different points of view.*

***Keywords:** classical theory, reflexivity theory, boom and bust, market, equilibrium, supply, demand.*

1. INTRODUCTION

The financial history has shown that major financial crisis, related with the disturbances into real economy have the same pattern of occurrence: a period of prosperity (after a period of disturbances such as war, social upheaval, natural disasters) characterized by great confidence followed by unproductive investments and speculations and than a sudden stops generate by events without an apparent importance.

Their occurrence is explained by the classical theory through the aggregate demand shock and its impact on the natural rate of output (at this level, economy being considered in equilibrium). From Soros' point of view the financial markets are inherently instable and the concept of general equilibrium has no relevance in real world. Also he advocate the importance of credit and money, these and real phenomena being connected in a reflexive fashion, influencing each other mutually. He also review the concept of the market as being always right, and the fact that its participants act by choosing the best available alternatives. In his view the market is wrong and its participants operate with bias which influence the course of events. The chain of causation does not lead directly from fact to fact but from fact to perception and from perception to fact. Because the world is not perfect, people do not act on the basis of

perfect knowledge and the economic equilibrium (when the allocation of resources is optimum) it does not exist. That is why we should rethink the relationship between the participants' understanding and the situation in which they participate.

Although Soros' theory is based on the analysis over twenty years of financial evolution and it does not take into account the financial and economic history, there are some points of view which deserve to pay attention.

2. EXPLANATIONS OF THE CLASSICAL THEORY

The main assumptions of classic theory is that in the long time price are flexible and the amount of output depends on the economy's ability to supply goods and services, which in turn depend on the supplies of capital and labor and on the available production technology. In short run, the assumption is that prices are sticky and the output depends on the demand for goods and services (which are influenced mainly by fiscal and monetary policies). The aggregate demand is the relationship between the quantity of output demanded and the price level and the aggregate supply is a function of the potential rate of output and the differential between the level of expected price and the real price. In the classic theory the equilibrium is at that point at which aggregate demand and supply cross at

that level where output is at its natural rate and the prices are those are expected.

On the base of these assumptions, the boom and bust markets evolution can be explain in this way: the economy begin in a long run equilibrium but when aggregate demand increases unexpectedly (because of social upheaval, wars, discoveries of new technologies), the price level rise from the price of equilibrium to a higher level causes the economy to boom. Because the price level is above the expected price, output rises temporarily above the natural rate, as the economy moves along the short run aggregate supply curve to a new point. Yet the boom does not last forever. In the long run, the expected price level rises to catch up reality causing the aggregate supply curve to shift upward. The economy returns to a new long equilibrium, where output is back at its natural rate and the expected prices are higher. In this process, according to the classic theory the shock generated by monetary supply is not the single and the main reason of the financial crisis.

3. SOROS' EXPLANATION

Soros consider that the concept of equilibrium is deceptive: since the adjustment process is supposed to lead to equilibrium, such a position seems somehow implicit in the observations. His starting point is that the equilibrium itself has rarely been observed in real life-market, prices having a notorious habit of fluctuating. The process that can be observed is supposed to move toward equilibrium but it is never reached. The market participants adjust to market prices but they may be adjusting to a constantly moving target. In that case, calling the participants' behavior an adjustment process may be a misnomer and equilibrium theory becomes irrelevant to the real world. Although the equilibrium is never reached, this does not invalidate the logical construction. The problem is, in Soros' view, that when a hypothetical equilibrium is presented as a model of reality a significant distortion is introduced. For classical theory the basic axiomatic approach is the theory of perfect

competition that was first propounded nearly two hundred years ago and it has never been superseded; only the method of analysis has been refined. The theory holds that under certain specified circumstances the unrestrained pursuit of self-interest leads to the optimum allocation of resources. The equilibrium point is reached when each firm produces at a level where its marginal cost equals the market price and each consumer buys an amount whose marginal "utility" equals the market price. The equilibrium position maximizes the benefit of all participants, provided no individual buyer or seller can influence market prices. It is this line of argument that has served as the theoretical underpinning for the laissez-faire policies of the nineteenth century, and it is also the basis of the current belief in the „magic of the marketplace”.

The main assumptions of the theory of perfect competition are: perfect knowledge; homogeneous and divisible products; and a large enough number of participants so that no single participant can influence the market price. The assumption of perfect knowledge is not good assumption because understanding a situation in which one participates cannot qualify as knowledge. As the human knowledge problems began to surface, exponents of the theory propose a more modest word: information. The assumption of imperfect information is not quite sufficient to support the construction of the theory. To make up for the deficiency, modern economists resorted to the idea that that the demand and supply curves should be taken as given, arguing that the task of economics is to study the relationship between supply and demand and not either by itself.

Demand may be a suitable subject for psychologists, supply may be the province of engineers or management scientists; both are beyond the scope of economic.

Because the supply and demand are independently given, an additional assumption has been introduced. Participants are supposed to choose between alternatives in accordance with their scale of preferences. The unspoken assumption is that the participants know what those preferences and alternatives are. But the

shape of the supply and demand curves cannot be taken as independently given, because both of them incorporate the participants' expectations about events that are shaped by their own expectations. Their role is clearly visible in financial markets. Buy and sell decisions are based on expectations about future prices, and future prices, in turn, are contingent on present buy and sell decisions. The situation is not quite so clear-cut in the case of commodities, where supply is largely dependent on production and demand on consumption. But the price that determines the amounts produced and consumed is not necessarily the present price. On the contrary, market participants are more likely to be guided by future prices, either as expressed in futures market or as anticipated by themselves. In either case, it is inappropriate to speak of independently given supply and demand curves because both curves incorporate the participants' expectations about future prices.

The idea that events in the marketplace may affect the shape of the demand and supply curves seems incongruous to those who have been reared on classical economics. The demand and supply curves are supposed to determine the market price. If they were themselves subject to market influences, prices would cease to be uniquely determined. Instead of equilibrium, we would be left with fluctuating prices. This would be a devastating state of affairs. All the conclusions of economic theory would lose their relevance to the real world.

The demand and supply curves are presented in textbooks as though they were grounded in empirical evidence. But there is scant evidence for independently given demand and supply curves. In markets the prices are continuously changing, the participants being much influenced by market developments, the commodity, stock, and currency markets confirms that trends are the rule rather than the exception.

The theory of perfect competition could be defended by arguing that the trends we can observe in commodity and financial markets are merely temporary aberrations which will be eliminated in the long run by the „fundamental” forces of supply and demand.

The trouble with the argument is that there can be no assurance that „fundamental” forces will correct „speculative” excesses. But it is just as possible that speculation will alter the supposedly fundamental conditions of supply and demand.

In the normal course of events, a speculative price rise provokes countervailing forces: supply is increased and demand reduced, and the temporary excess is corrected with the passage of time. Soros invoke here the foreign exchange, where a sustained price movement can be self-validating, because of its impact on domestic price level; the stock market, where the performance of a stock may affect the performance of the company in question in a number of ways and the international lending where excessive lending first affect the debtor countries' ability and willingness to repay the debt. The question is if these exceptions that confirm the rule, or do them necessitate a revision of accepted theory and the answer depends on the frequency and severity of their occurrence. Soros considers that is not possible to understand macroeconomic developments without taking the phenomenon into account. A world of fluctuating exchange rates and large-scale capital movements is characterized by vicious and benign circles in which the „normal” pattern of causation, as defined by classical economics, seems to be reversed: market developments dictate the evolution of the conditions of supply and demand, not the other way around.

In his theory of reflexivity the main assumptions are: imperfect understanding, the social science problem and the participants' bias. The issue of imperfect information is analyzed by comparing the position of participants with that of natural scientist. The basic idea of imperfect information is that unlike the other science which has an objective criterion at their disposal, but the participant thinking is not independently given: it is contingent on their own decision, making the validity of participant view deficient. The problem of social science is that the scientific method is designed to deal with fact, but the economic events do not consist of fact alone, introducing an element of uncertainty into the

subject. Although it could be a similarity between the uncertainty principle of Heisenberg and the uncertainty introduced by the participants' thinking the parallel is misleading because in the first case uncertainty is introduced by the outside observer and the later case the by the participants. The participant bias can be indicated by the course of events different from the participant expectation.

The reflexivity in Soros theory is a function which can be describe as a pair a recursive function: cognitive function in which the participant perception depend on the situation and the participating function where the situation is influenced by participants' perceptions. In the cognitive function the independent variable is the situation and in participating function it is the participant thinking. When both functions operate at the same time, they interfere with each other, and this interaction is called reflexivity. The two recursive functions do not produce equilibrium but a never-ending process of change that made historical processes shaped by misconceptions of participants. Unlike the reflexivity theory the equilibrium analysis eliminates cognitive function which is replaced with the assumption of perfect knowledge. If the cognitive function was operating, events in the market place could alter the shape of demand and supply curves (which are expression of the participation function only) and the equilibrium never be reached.

Because the process of adjustment does not lead to equilibrium, the conclusions of economic theory are that they remain valid as deductions but they lose their relevance to the real world. His conclusion is if we want to understand the real world, we must divert our gaze from a hypothetical fins outcome and concentrate our attention on the process of change that we can observe all around us. But it will require a radical shift in our thinking because a process of change is much more difficult to understand than a static equilibrium. The first step is to revise many of the preconceived ideas about the kind of understanding that is attainable and satisfy ourselves with conclusions that are far less

definite than those that economic theory sought to provide.

His point of view is that boom and bust evolution of the economic history was affected by the level of credit complicated by influence of economic policies. One of the flaws of classic economy is that it does focus mainly on the real world and neglected the problems connected with money and credit. Money are not the simple mirror of the state if affairs in the real world, valuation being a positive act that makes the impact on the course of events, they are connected and influence each other mutually.

The relationship manifests most clearly and the use and abuse of credit. Loans are based on the lender's estimation of the borrower's ability to service his debt. The valuation of the collateral is supposed to be independent of the act of lending; but in actual fact the act of lending can affect the value of the collateral. This is true of the individual case and of the economy as a whole. Credit expansion stimulates the economy and enhances collateral values; the repayment or contraction of credit has a depressing influence both on the economy and on the valuation of the collateral. The connection between credit and economic activity is anything but constant - for instance, credit for building a new factory has quite a different effect from credit for a leveraged buyout. This makes it difficult to quantify the connection between credit and economic activity. Yet it is a mistake to ignore it. The monetarist school has done so, with disastrous consequences. The reflexive interaction between the act of lending and collateral values has led Soros to postulate a pattern in which a period of gradual, slowly accelerating credit expansion is followed by a short period of credit contraction-the classic sequence of boom and bust. The bust is compressed in time because the attempt to liquidate loans causes a sudden implosion of collateral values.

The most important conclusion of Soros analysis of his theory of reflexivity in the real world (the stock market, the currency market, and the international credit market from 1982 onward) is that credit matters, not money (in other words, monetarism is a false ideology), and, second, that the concept of a general

equilibrium has no relevance to the real world.. Financial markets are inherently unstable.

Unlike the most accepted points of view, which consider the financial market as being not important for economic evolution. In this respect, the main effects of financial markets over the economic evolution financial systems are to produce information ex ante about possible investments and allocate capital, monitor investments and exert corporate governance after providing finance, facilitate the trading, diversification, and management of risk, mobilize and pool savings, ease the exchange of goods and services. In Soros view the financial market, especially credit market is determinant for the economic evolution.

8. CONCLUSIONS

For classical theory, the financial market is not the main preoccupation, being rather neglected, its role being seen as secondary in economic evolution. Although the real variables are and should be the main aspects to be analyzed it is necessary to rethink the role of financial market, especially the credit market and its impact on evolution of real variables.

Also it is necessary to take into account the possibility that the accepted theory about the market and its participant to be reviewed. It is a thing that taking into account these aspects when we try to find explanations about recurrence of financial crisis, it is possible to find an answer to the question why the classical theory is not enough to make us not to repeat the same pattern of behavior from the past.

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ARMED FORCES TRANSFORMATION TO COUNTERACT THE SECURITY ENVIRONMENT CHALLENGES

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Abstract: *Increasing the violence resources of the nowadays security environment produces major alterations world-wide, in all domeniies of states activities. These aspects become more relevant as the present world power system, tending to unipolarism, is not a premiere. Through history, there have been noted many tendencies to organize the international system. The first of these was the Vienna Congress (1815), which recorded the defeat of the Napoleonian France hegemony, leading to the first multipolar organization of the European great powers structure at that time. The way those events influenced the military forces transformation may become relevant for the present international phenomena. The massive increasing of the violence resources of the present world, enlarged by the statal and non-statal actors possibility to posses these, means a strong enough challenge to provoke a states military capabilities transformation, in order to counteract these threats. In this context, the military transformation is not only the gradual reform or the new systems acquisition, but also the personnel outlook changing, as well as its resolution to adapt to the security environment requirements. In addition, the military transformation needs technological modernisation, doctrines reform, Armed Forces reorganisation, risks acceptance, redefining the way in which the combat force is generated and engaged.*

Keywords: *security environment, bipolarity, unipolarity, chaos axis, expeditionary forces, modularity.*

1. INTRODUCTION

The third millenium world is full of contrasts, unpredictable, contradictory and in continuous changing. However, no later than 20 years ago, shortly before the end of ‘the 77-year war’, many considered that the globe was forever split between two military blocks led by two super-powers: The United States of America and The Soviet Union. After the bipolar contest and the Soviet Union sudden demise, in December 1991, world seems now to be much complex and, certainly, much confusing.

2. THE PRESENT SECURITY ENVIRONMENT

Unfortunately, the current world-wide structure is far from „the eternal peace” [1] prefigured by the German philosopher Immanuel Kant, nearly 200 years ago. In the

present world, there are no states with equal rights, but only failed states, evil/chaos axis or states placed at opposite developed poles. In the current international shape „the right of force” is stronger than „the force of law” and, moreover the fault lines have been reactivated, mostly those between West and East. Alliances are made and un-made, thus former enemies becoming today’s friends.

The natural arising questions are related to the following matters: is the actual world one of a „clushing civilisations” [2] on a huge „chess table” [3], or are we sitting „between war and peace” [4] and after the Cold War ending a „Cold Peace” [5] will follow? Besides, may we ask ourselves if the controversial hypothesis of „the end of history” [6] is still actual or will the world-wide nations be compelled to constantly fight for „hegemony or survival [7]? On the other hand, could we firmly sustain that the present globe leader - United States of America –

fighters „against the world” [8] or as it reaches its summit will it soon live its last days [9] Moreover, can the current world completely avoid „the chaos traps” [10] or do we already witness „the beginning of the end” [11]?

A complete answer for all these questions is not possible, at the present moment. Nevertheless, a number of projections and assessments related to the main features of the current security environment might be made.

Therefore, we may say that we witness the bipolarity demise and the beginning of a new stage, in which the unipolarity will express. In the same time, European Union is increasingly asserting at world-wide level and new power centres are appearing. On the other hand, a number of statal and non-statal actors shows their presence at international level, in the same time with new solutions and methods appearance for the international political, economical and security institutions and organisations development and work. Besides, of a paramount importance is the development of the collective security concept and the crises management trends on regional basis.

All these trends take place even though the struggle for resources and markets of all the relevant international actors is still in place.

3. MILITARY FORCES TRANSFORMATION

Military Forces transformation is imposed by the nowadays realities. Firstly, the 9/11 events were one of the most serious signals showing that the instability sources lay outside the affected states territories. In addition, the Afghanistan military operations have shown the modern, expeditionary forces superiority – light and technological highly-prepared - as well as those of the decision-making, command-control systems, leading to the re-evaluation of the military structures and operational concepts.

Another requirement of the Armed Forces transformation is posed by the new battlefield shape. The armed forces and budget downsizing, reorganizations, transformations, re-endowments, complete professionalisations, new risks, threats and vulnerabilities emergence, the stability and military operation

other than war generalisation may impose the shift of the military actions performing, the appearance of new technologies, (integrated, multinational) doctrines and the different training of the armed forces (becoming expeditionary forces), during peace time, crisis or conflict/war.

Under these circumstances, the combat disposals can no longer be rigid, linear or circular (anti-guerrilla), but asymmetric (non-linear). The linear, static combat (like that of the first and second world war) is considered obsolete and avoided. The modern battlefield is no longer uniform, linear, classic, having strips, dispositions, zones, depths, demarcation lines.

The recent conflicts and wars lessons learned have led to special studies issued by experts and comprised in Doctrines (Counterinsurgency Doctrine of U.S. General Petraeus), Regulations, Guides and Rules of Engagement. Military actions are performed in a fluid, multi-dimensional battlefield described by: asymmetric actions, mobility, decentralization, manoeuvrability, flexibility, large-scale usage of Land, Maritime, Air, Space, Intelligence, PSYOPS and Special Operations actions. All of the above are fulfilled at all three levels of the military art, continuously, with a high pace, in order to hit the enemy gravity centers and decisive points and to physically and psychically defeat him.

Moreover, equally important is the meaning of the 4th of April 2009, when NATO Heads of States and Government met at the Strasbourg/Kehl Summit, and expressed their view points related to the most relevant aspects of the military capabilities development, in accordance with the international environment progress. Among these there are matters concerning mission-capable helicopters, strategic lift and the Alliance Ground Surveillance system as well as the Cooperative Cyber Defence Centre of Excellence. Lately, this final domain tends to become one of the key-factors of the present and future military capabilities development.

The battlefield digitalization, modularity and combat simulation, intelligence and psychological warfare winning (as well as network warfare and effects-based operations)

are the main priorities of all major international actors. However, at that moment, these tools are available only for the world great powers and Alliances, with impacts on the combat features, mainly on the forces effective training in wartime and peace.

For this, the new force structure must be agile and expeditionary. This aim means that extensive airlift and maritime capabilities should be in place. As a plus, the materials and weapons systems must have the dimensions and outlines in order to allow air and maritime transportation.

Moreover, the expeditionary operations command, control and communications systems are needed in order to link, in proper time, the combat forces in different theaters of operations/deployment areas with the respective state/states as well as with the theater/deployment area joint force command-control structure.

Precision, speed, agility and ability of the forces rapid dispersion and concentration are the key features of the future expeditionary structures. The respective forces should be endowed with light equipments, high-precision weapons, increased fire power.

In the operational environment, forces must have a co-ordinated and low-profile logistic multinational infrastructure in order to protect the vital supplying routes.

Both the expeditionary forces support and the offensive as well as the defensive combat actions will be sustained by the air and maritime transport, reconnaissance, interdiction, intervention capabilities.

Besides, these forces must be modular organized, trained and endowed in order to be flexible enough to rapidly shift from high-intensity combat actions to humanitarian aids, low-profile actions, which are supposed to imply different actions conceptions and rules of engagement, different dimensions and composition of the military structures employed in operations.

4. CONCLUSIONS

In order to address the numerous threats and internal pressures posed against the military

organization, a new force structure must diminish as much as possible the difference between the willing to achieve the desired state and the possibility to fulfill this.

The military transformation is not only the gradual reform or the new weapon systems acquisition, but also the personnel mentality change, as well as its resolution to adapt to the security environment requirements.

In addition, the military transformation needs technological modernisation, doctrines reform, Armed Forces reorganisation, risks acceptance, redefining the way in which the combat force is generated and engaged.

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TRANSFORMING NATO: BEYOND A NEW STRATEGIC CONCEPT

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Abstract: *The process leading to a new NATO strategy is in its initial stage. NATO should not miss its goal of formulating concise, coherent and forward looking strategic guidance that can satisfy political leaders, military planners and public elites at the same time. NATO's Strategic Concept is currently more a potential source of dispute than a framework for action. What in 1999 seemed to be appropriate, to have elastic formulations whereby each member-state could adapt the framework to its own needs, is today a source of transatlantic disagreements. Some of the unresolved questions relating to the 1999 Strategic Concept as the geographical limitations of NATO's involvement are no longer applicable and have been answered through concrete actions in Afghanistan and in Iraq.*

Keywords: *Cold War, Dissolution of the Warsaw Pact, Non-article 5 Operations, Strasburg/Kehl Summit, Multipolarity, Decision Making Process, International Security, Alliance' Strategic Concept, NATO, Harmel Report.*

1. INTRODUCTION

The Allies have historically not prepared strategic concepts frequently. They have done so only when convinced of the political and practical necessity of such a complex, sensitive, and cumbersome undertaking. The 1991 Strategic Concept was prepared in light of the end of the Cold War and the dissolution of the Warsaw Pact. Prior to 1991, the Allies had not prepared a strategic concept since 1967, when they approved MC 14/3, widely known as the military strategy of “flexible response.”¹ In 1967 they also endorsed the Harmel Report, which set forth the Alliance's broad political strategy for relations with the Soviet Union and its Warsaw Pact allies.² MC

14/3 and the Harmel Report together, covering political as well as military strategy, dealt with approximately the same areas encompassed by the 1991 Strategic Concept. The fact that the Allies saw no compelling need to prepare a new strategic concept during the 24 years from 1967 to 1991 may be attributed not only to factors such as the stability of the East-West stalemate and the intrinsic latitude of the 1967 policy statements, but also to acute awareness of the political difficulties and risks involved in preparing such documents. The functions of strategic concepts since 1991 present a further deterrent to undertaking a revision lightly.

Prior to 1991, the Alliance's strategic concepts were classified documents dealing with military strategy for deterrence and defense and corresponding force requirements. The Allies composed the 1991 and 1999 Strategic Concepts with this purpose in mind, but also with the objective of communicating the Alliance's political strategy to their own citizens and to non-Allied governments and publics. As a result, since 1991 the Alliance's

¹ MC 14/3, “Overall Strategic Concept for the Defense of the North Atlantic Treaty Organization Area,” approved by the Defence Planning Committee in Ministerial Session on 12 December 1967, is available in Gregory W. Pedlow, ed., *NATO Strategy Documents 1949-1969* (Brussels: NATO Information Service, 1997), pp. 345-370.

² The Harmel Report, named after Pierre Harmel, then the Belgian Foreign Minister, is available under its formal title, “The Future Tasks of the Alliance,” Report of the Council, Annex to the Final Communiqué of the

Ministerial Meeting, December 13-14, 1967, in *Texts of Final Communiqués, 1949-1974* (Brussels: NATO Information Service, 1975), pp. 198-202.

strategic concepts have been unclassified statements with many purposes, above all, offering a coherent framework for the Alliance's many activities; providing guidance for military policy, including operations and force development; promoting public understanding of the Alliance's policies; and communicating the Alliance's intentions to potential adversaries as well as current and prospective partners.³

2. STRATEGIC CONCEPT OUTDATED?

The Allies had undertaken major non-Article 5 operations and had dramatically increased the scope of their outreach and cooperation with former adversaries and other countries in the Euro-Atlantic region. In the 1991 Strategic Concept the Allies acknowledged the risks of ethnic and territorial conflict in central and Eastern Europe, but expressed little expectation of performing non-Article 5 missions such as crisis management and peacekeeping. In fact, rather than anticipating the major operations of the 1990s, the Deliberate Force Operation air strikes in August-September 1995, followed by NATO-led Implementation Force (IFOR) and Stabilization Force (SFOR) deployments in Bosnia, and the Operation Allied Force air campaign in March-June 1999 and the subsequent Kosovo Force (KFOR) mission, the authors of the 1991 Strategic Concept focused on the Alliance's Article 5 task: collective defence against aggression affecting Alliance territory, not intervention beyond that territory.

The language of the 1991 Strategic Concept suggests that NATO did not then envisage participating in any crisis management or peacekeeping operations as they came to be understood in subsequent years: "The Alliance is purely defensive in purpose: none of its weapons will ever be used except in self-defence. The role of the Alliance's military forces is to assure the

territorial integrity and political independence of its member states, and thus contribute to peace and stability in Europe."⁴ Similarly, while the 1991 Strategic Concept envisaged dialogue and cooperation with non-NATO countries, it did not refer to the North Atlantic Cooperation Council (NACC), which was not founded until the following month. The NACC was designed to promote constructive interactions with former adversaries, initially defined as former members of the Warsaw Pact. When the Soviet Union disintegrated in December 1991, the NACC was expanded to include all former Soviet republics. In January 1994, moreover, NATO established the Partnership for Peace (PfP), a program of cooperation open to all countries in the Euro-Atlantic region, defined as the territory of the members of what was then called the Conference on Security and Cooperation in Europe (CSCE).⁵ In other words, PfP was (and remains) open to countries in addition to those that were formerly part of the Warsaw Pact or the USSR.

NATO has offered its PfP Partners a security consultations pledge with wording similar to that in Article 4 of the North Atlantic Treaty.⁶ In the Mediterranean Dialogue, founded in 1994, the Allies have pursued bilateral exchanges of views with several North African and Middle Eastern nations. In May 1997 the Alliance founded the Euro-Atlantic Partnership Council, which replaced the NACC and brought together the Allies and all PfP members. During the 1990s the Alliance also substantially deepened its interactions with Russia and Ukraine. It was

⁴ North Atlantic Council, *Strategic Concept*, 7 November 1991, paragraph 36.

⁵ The CSCE became the Organization for Security and Cooperation in Europe, or OSCE, in December 1994.

⁶ The North Atlantic Council declared in January 1994: "NATO will consult with any active participant in the Partnership if that Partner perceives a direct threat to its territorial integrity, political independence, or security." *Partnership for Peace Framework Document*, approved by the North Atlantic Council, 11 January 1994, par. 8. According to Article 4 of the North Atlantic Treaty, "The Parties will consult together whenever, in the opinion of any of them, the territorial integrity, political independence or security of any of the Parties is threatened."

³ While the 1991 and 1999 Strategic Concepts are unclassified, MC 400, the military implementation document prepared by the NATO Military Authorities, and other military guidance documents are classified.

accordingly appropriate that the Alliance first publicly announced its intention to examine the 1991 Strategic Concept with a view to updating it in the May 1997 NATO-Russia Founding Act. The Allies deleted the references in the 1991 Strategic Concept to maintaining “the strategic balance within Europe,” which Moscow had found so offensively reminiscent of the Cold War.⁷

Three missions remained essentially unchanged in the 1991 and 1999 Strategic Concepts: serving as a forum for consultation, providing for collective defence, and supplying “one of the indispensable foundations for a stable Euro-Atlantic security environment, based on the growth of democratic institutions and commitment to the peaceful resolution of disputes, in which no country would be able to intimidate or coerce any other through the threat or use of force.” To reflect the Alliance’s principal new post-1991 activities, the 1999 Strategic Concept listed two additional fundamental security tasks: crisis management, including conflict prevention and crisis response operations; and partnership, including dialogue and cooperation, with other nations in the Euro-Atlantic region.⁸ The 1999 Strategic Concept also differed from its predecessor in devoting more attention to efforts to promote nonproliferation and to deter and counter the proliferation of weapons of mass destruction (WMD), and this extended to defining the preferred characteristics of Allied conventional forces. “As NATO forces may be called upon to operate beyond NATO’s borders, capabilities for dealing with proliferation risks must be flexible, mobile, rapidly deployable and sustainable.”

The discussion of nuclear forces nonetheless remained almost unchanged in the 1991 and 1999 Strategic Concepts. The most noteworthy revisions included the judgment in 1999 by the “Allies concerned” that “The circumstances in which any use of nuclear weapons might have to be contemplated by

them are extremely remote” and their announcement that “NATO’s nuclear forces no longer target any country.”

3. TURBULENT PERIOD

The fact that NATO has evolved from a Eurocentric defence alliance to a global security provider has blurred the lines between the various requirements of security, deterrence, defence or stability. Over the last two decades NATO has adopted a number of tasks which were not foreseen in its initial design as a means for Western self determination and self defense against the Soviet threat. In consequence, there is an urgent need to define NATO’s role in the international security environment. Although NATO is currently more active than ever before in its history, the positive attention it receives remains comparably low. The engagement of most publics in member nations in security policy requirements is traditionally limited, and thus it is still difficult to gather political support for providing sufficient resources for military operations.

Many governments take the lack of interest of their electorates in defence issues for granted and refrain from any attempt to counter this trend. The consequences can be seen with regard to NATO’s engagement in Afghanistan: fewer national governments make an effort to explain to their electorate the need for NATO to act far beyond its territorial borders. The new strategy was supposed to be presented at NATO’s 60th anniversary summit in Strasbourg/ Kehl in April 2009, as the previous Strategic Concept was agreed upon when NATO celebrated its 50th birthday ten years ago. A number of factors baffled this intention. Despite the interest, particularly among the “new” NATO members (who joined the Alliance after the end of the cold war), in a new strategic foundation for NATO, many of the “old” members had their doubts. The “old” members pointed to the general and all encompassing character of the current strategy, asking whether NATO would find a consensus on developing something more specific. Moreover, there was concern that a publicly held strategic discussion could reveal

⁷ North Atlantic Council, *Strategic Concept*, 7 November 1991, paragraphs 14, 21.

⁸ North Atlantic Council, *Strategic Concept*, 24 April 1999, paragraph 10.

how disunited NATO was on key questions like the future role of the Alliance. There were also practical impediments, like the political calendar in the United States.

President Obama, who took office in January 2009, would not have been able to install the entire administration early enough to engage fully in a debate on the basics of the Alliance. As an intermediate solution, a Transatlantic Declaration had been proposed to provide NATO with some political guidance until the new strategy was finalized. This document called the Declaration on Alliance Security (DAS)⁹ and written under the auspices of the former Secretary General Jaap de Hoop Scheffer, was adopted at NATO's Strasbourg/Kehl summit. Unfortunately, the document made only very general political statements, disappointing those who were expecting some strategic counselling for NATO's further evolution. Its evolution also set the tone for the upcoming debate on the new strategy, as even the general statements in the two-page paper were highly contested until the very last moment before the summit and required decisions at the highest political level. The most interesting part of the DAS is the last paragraph, as it contains carefully negotiated wording on how the new Strategic Concept will be drafted. While previous NATO core documents were drafted by the NATO Council, this time the NATO Secretary General will be in charge of the process.

4. PERSPECTIVE PROBLEMS OR SOLUTIONS?

Is a new strategic concept a panacea for all difficulties? Of course not, but even an agonizing strategic debate with dissenting views and "agreements to disagree" would have at least two crucial advantages; a/ all NATO members would be forced to clarify and precisely express their own positions. Such transparency would increase the general pressure to adapt the individual engagement to commonly agreed positions. Free riding would become much more difficult, b/ by definition,

NATO would become the centre of the transatlantic security dialogue again. Furthermore, popular misperceptions of Europeans humbly accepting US orders would be countered. Assuming that NATO agrees on such a strategic debate, what would its content be?

What are the points to be tackled in a new strategic concept? Two fundamental insights, often disguised by political rhetoric, need to be taken into account. First, the incontestable dominance of the United States not only in military but also in economic and political terms is going to persist for many years to come. This American "hyper power" is not per se "good" or "bad", but it has to be taken into account, whether one likes it or not. This has two vital implications, any future direction of NATO will be determined crucially by the national preferences of the United States and "multipolarity" in the sense of counterbalancing American supremacy is not going to happen any time soon, even if the call for a multipolar world is constantly repeated in Paris, Beijing or Moscow. Moreover, it is far from sure whether such a multipolar world with America, Europe, Russia, China, India and other potential "poles" would be a more stable one. Second, the build-up of a true European Security and Defence Policy (ESDP) will take longer than expected, since the EU member states are not prepared to bolster their ambitious political goals with adequate financial means. This has positive as well as negative implications. Positive, since the idea of ESDP being a counterweight to the perceived American hyper power will remain an illusion. Negative, because the beneficial concept of ESDP providing synergetic means to complement American military capabilities will take longer to realize as well.

Closely connected to the question of NATO's role of both defence and security is the question of how to deal with Russia. This is a major issue in almost all NATO debates. Even the group that drafted the DAS spent a significant part of its discussion on the Russia question. The dilemma is striking: on the one hand, NATO and Russia are engaged in a unique partnership "at 29" (28 NATO members plus Russia) organized in a special

⁹ http://www.nato.int/cps/en/natolive/news_52838.htm?mode=pressrelease, 11.05.2009

forum, the NATO-Russia Council. On the other hand, a large number of NATO Allies - given their history and geographic location - view Article V as primarily directed against Russia, since there is hardly any other country imaginable that would be able to launch a military attack against NATO territory. The Georgia crisis in 2008 has worsened the situation. In the NATO Council there was no unity on how to react to the military escalation. Media in the Baltic States raised the question of how NATO might have reacted if Russia had chosen to take military action in order to “protect” Russian minorities in Estonia or Latvia. In the meantime, NATO has declared that it will not return to “business as usual” but at the same time that it will re-establish relations between Brussels and Moscow. Hence, it still remains unclear how NATO intends to deal with a partner as important as it is difficult to handle.

5. CONCLUSIONS

In the wake of the fundamental changes in the international security landscape throughout the last decade, the expectations of a new Strategic Concept are very high. The process leading to a new NATO strategy is in its initial stage. It remains to be seen whether the procedures currently envisioned can sustain the complex grid of NATO’s decision making processes. Given the wide spectrum of national preferences, regional priorities and political differences among 28 NATO member states, forging consensus will be an extremely demanding task.

NATO should not miss its goal of formulating concise, coherent and forward looking strategic guidance that can satisfy political leaders, military planners and public elites at the same time.

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SYMMETRY AND ASYMMETRY IN MODERN MILITARY ACTIONS

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Abstract: Within this context when the United States of America have no much worldwide concurrence and remained the only informational, technological, military and economic superpower, it is expected that the range of asymmetrical confrontations should extend globally and regionally speaking and Romania has the obligation to start its preparations regarding the new context of security environment.

Keywords: symmetry, dissymmetry, asymmetry, terrorism, guerrilla.

1. INTRODUCTION IN MODERN MILITARY ACTION

Although the war, represented by the armed combat, is out of law in more than 80 countries, is less and less popular in the world public opinion and is more and more tried to be avoided, it is expected that it could not be avoided in a near future.

Of course, the future war will be differently shaped, under much diversified aspects, according to the armies' capabilities, involved in the conflict, starting with the discouraging “surgical” actions, continuing with multiple diplomatic, economic, political actions, to those of informational, psychological, climacteric or cosmic nature.

Most of the military specialists estimate that the dynamic of the military capabilities changes and transformations shall strikingly increase in the next 20-30 years and the most important evolutions shall take place in the field of the military high-tech.

It is expected to increase in a substantial way the range of striking high-tech capacities, the technological sophistication level, the degree of using the stealth technology, sensors and “combat networks” and the unmanned systems shall become indispensable components to all structures and forces.

This profound progress (extensions) in using the last-generation technologies within the occidental armies and especially within the

USA's army, shall determine answers from the other powers or potential opponents, answers that shall include both a symmetrical component – by producing and using the same technologies – and an asymmetrical component, based on the disruptive offensive or defensive capacities.

The future combat space extends the concept of armed conflict by placing the operational aspects in a larger context which includes political, economic, social, demographic, juridical, normative technological and also ecological elements.

The protagonists in the war of the future, shall use complexity, ambiguity and asymmetry in order to discourage and avoid an external intervention and, in case of this strategy failure, they will rely on avoiding the implication in decisive operations and expanded campaigns and they will make use of ways specific to the informational, diplomatic war, which means atypical ways.

Even if the symmetry, dissymmetry and asymmetry issues are under the political-military specialists' magnifying glass only after 1995, it is old ever since the world began and it appeared within the first armed conflicts that is for more than 4000 years.

At the beginning of this millennium, we cannot exclude the possibility of some military conflicts between the powerful and high-developed countries but, as it is noticed during the last 60 years, they have fewer perspectives

to take place, knowing that the great powers of the world avoid direct, military confrontations.

2. ASSIMETRY IN MODERN MILITARY ACTION

The existence, during this period, of a single world power, the United States of America, by its military, technological and informational superiority, diminished even more, the symmetry's¹ role within military actions to dissymmetry detriment, which supposes a quantitative and qualitative domination of one of the parts, respectively a lack of proportionality, incompatibility between the two confronting forces.

The conflicts spectrum after the cold war's end, demonstrates the fact that dissymmetry, as domination strategy of one of the parts, determined asymmetry, which is shown by the weaker' part attempt to compensate the lack of proportionality by specific ways.

Therefore, asymmetry means, for the conflict protagonist, an adapted approach, aiming to avoid or to counteract the opponent's strong parts (points, components), without trying to interpose in a direct way, trying to exploit its weak points, in order to maximize its own advantages and to exploit the opponent's weaknesses.

As a rule, the asymmetric actions are deployed according to atypical rules, methods and procedures, aiming to obtain results with the least efforts, casualties and material damage reduced.

Among the forms, procedures and actions specific to the military art of the asymmetric type, we can highlight the "terrorist" actions, the resistance combat, the guerrilla combat, the harassment, the demonstrative actions, the sabotages, etc. so that they could direct to create and maintain a permanent state of anxiety and tension among the opponents. We can also consider as asymmetrical actions the

organized crime, drug traffic, fanaticism and fundamentalism of any kind.

The armies, obliged to face a superior opponent, avoid the open and direct combat, use the techniques of guerrilla war, prefer actions such as "strike and run", misleading actions, harassment, striking in complex zones, which cannot allow its deployment: localities, mountainous-woody fields, swampy regions, jungle, etc.

The characteristics of asymmetric actions are:

- they are uncommon, seen from the perspective of the western democracies;
- they are situated beyond the so called normal actions;
- they don't have a correspondent (equivalent) within the capabilities arsenal of western armies;
- they are intended against some military but also civil objectives;
- it is difficult to be answered to, in the same way, to balance accounts;
- it is difficult to be answered to, in a discriminatory and proportional way;
- they are hard to be anticipated, prevented and they have a powerful psychological impact;

In order to counteract these actions, the states invest ample resources and intelligence to elaborate some multidimensional asymmetric strategies, used both against terrorism and all kinds of fanaticism and also within the informational war, based on the network, the psychological, media and geophysical wars.

In the new context of security environment, in our case, the Romania's, it is necessary to adjust the structures of the national safety insurance, in order to face the menaces, to understand them and to find the adequate ways to annihilate them.

Thus, among the measures of the response type that can be tackled, we can mention, in a stochastic and non-exhaustive order, the following:

- the reorganization of the military structures and the improvement of the armament systems, that is to renounce the high fire power systems and to adapt high tech solutions;

¹"Symmetry supposes, in the field of confrontation, forces, doctrines, strategies and resources similar or compatible, which give certain proportionality to action and to reaction", Col. PhD Ion Mitulescu, *Atypical and asymmetrical within modern military actions*, U.N.Ap., Bulletin no. 1/2006, p. 156.

- to employ more mobile and more trained troops;
- adaptations of doctrinal type from the perspective of military actions deployment in marked asymmetry conditions;
- preventive actions;
- using information as a power factor within the preventive actions;
- preparing and deployment of efficient informational and psychological operations;
- disorganization and reduction of the opponents' action capacity by controlling the illegal immigration and the monetary flow of terrorist cell;
- actions of active diplomacy and international cooperation;
- making secure objectives having a high level of importance against some unexpected attacks;
- maintaining the positive mood of the population and of the participants to such attacks, avoiding panic;
- preparing decisional factors in crises management;

3. CONCLUSIONS

The conflicts spectrum after the cold war's end emphasized the confrontation asymmetry

which is expressed by the weaker' part attempt to compensate the lack of proportionality by specific ways.

I consider that the military actions which are to be deployed in the near future will have the characteristics of an asymmetrical confrontation where the atypical methods and procedures of counteracting the opponent's vulnerability will be prevailed.

I think that everything happening in the future in the field of confrontations, including the military ones, will bear the mark of asymmetry; we shall speak about an art of strategically asymmetry in the first half of the 21st century.

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DECISION MAKING PROCESS AND THE ALGORITHM OF AIR COMBAT SIMULATION

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Abstract: *Modern computer technology brings a new dimension into the decision making process. For optimal decision mathematical methods of the operational analysis and simulation of combat activities are used. The whole simulation process of the air combat is divided into several separate stages. The air combat simulation program for personal computers was processed on the basis of the mentioned algorithm. The model of decision making process was used for optimal using of Air Defence units.*

Keywords: *Effects Based Operations, Decision Support System, Decision Making Process, Modeling & Simulation, Asymmetric Threat, Air Defence.*

1. INTRODUCTION

Major war, in the sense of formal and total conflict between industrialized states became considered generally unlikely. However, conflicts do still occur among minor states, and the use of force short of war inside some states is seen daily. The Global War on Terrorism shapes a transformation for new missions of militaries in many countries in the world. Adaptation for new missions and overall transformation of Armed Forces include intellectual, organizational, and material areas. Transformation of capabilities in intellectual area means a change of analytical tools, state-of-the art techniques, tactics and logistics in information age. Operations could be seen as a material-energetic and idea-information process, which goes through multi dimensional space and time. Environment and his parameters have always had a huge meaning to success of operation. Therefore, all relevant aspects (geometric, time, social, and natural) of environment of an operation area are to be involved and to be considered with models and simulation.

Although most (if not all) military and political decision makers must have considered the potential effects of their actions

throughout time, Effects Based Approach (EBA), also known as the Effects Based Approach to Operations (EBAO), is an emerging and improved way of planning and conducting operational campaigns based on a holistic understanding of the operational environment taking all instruments of power of the political, military, civil and economic (PMCE) spectrum into account. NATO uses often the term PMCE (Political, Military, Civil and Economic) and sometimes the term DIME (Diplomatic, Information, Military and Economic) too. It is because as alliance of nations NATO is more acting on a political level than having own diplomatic resources.

Document NATO „Implementation of the Allied Command Transformation” sees new and broader alliance missions in:

- Conflict Prevention and Crisis Management,
 - Peacekeeping - Humanitarian Operations - Disaster Relief,
 - Stabilization and Support to Reconstruction,
- which needs to harmonize efforts with other actors like International Organizations, National Governments, Non-Governmental Organizations and Industry [1]. Therefore the Allied Command Transformation is supporting experimentation and conceptual development which could lead to comprehensive changes in organization, processes, policy, doctrine,

strategy and training and education to enable EBAO for NATO.

2. EFFECTS BASED OPERATIONS (EBO)

The multinational concept of operations (CONOPS) developed for describes a way of planning and conducting Effects Based Operations (EBO). It introduces several new operational concepts and defines a process for organizations to carry out EBO [2]. The NATO Military Committee (MC) has expressed its position on the EBO and as a result the EBO Implementation Working Group in NATO is established who is tasked to develop a viable roadmap for NATO with respect to EBO. Modeling & Simulation Support to the Effects Based Operations is based on a holistic understanding of the operational environment looking at both physical and behavioral aspects of a system (a conflict state) to be changed taking all instruments of power of the PEMC spectrum into account (Fig. 1).

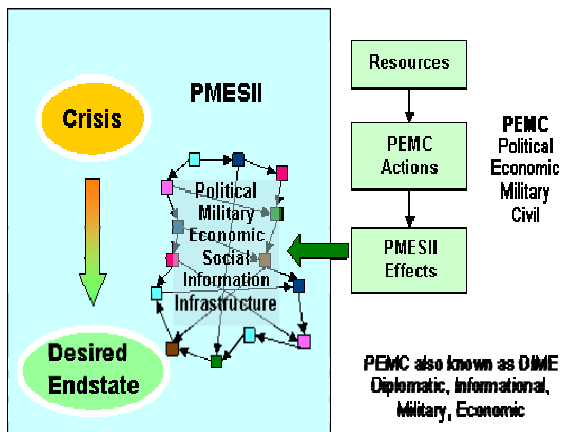


Fig. 1 Effects Based Operations

The conflict state is described by its associated PMESII (Political, Military, Economic, Social, Information and Infrastructure) elements in a system of systems approach. Elements with their links and relationships represent the system. The effects based approach comes into play in looking at the effects (required changes in the system state) that have to be achieved to reach the desired end state. In order to achieve effects,

actions throughout the PMCE spectrum have to be carried out using all available and capable resources [3].

We can divide the EBO model into few sections (Fig. 2). In the centre of this model there is the System State, which is represented in the Knowledge Base. The assessment of the system state in Effects Based Assessment (EBA) and Effects Based Planning (EBP) (situation awareness and understanding) starts the process. If the present system state is not acceptable the planning phase is started. The desired end state is defined and the effects to be achieved, including their sequencing, to reach the end state is assessed. The next step is to match actions and resources to gain the desired effects. EBP includes the synchronization of all actions and the development of an Effects Based Plan (EB Plan) with a Course of Action (COA).

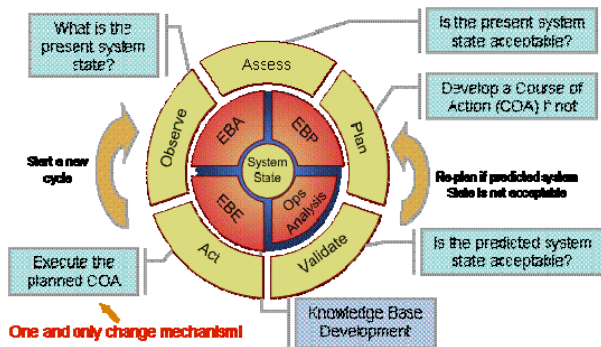


Fig. 2 Model of Effects Based Operations

Already during this process Operational Analysis (Ops Analysis or OA) with the use of respective tools helps to generate alternatives and to assess different courses of action. The chosen EB Plan is war-game and it is validated. This plan then forms the basis for operational execution (Effects Based Execution or EBE). Effects Based Assessment tries to capture all relevant data to assess the status of the plan achievements during the following execution. This is done using the measures defined during the planning phase: measures of performance (MOP – action related) and measures of effectiveness (MOE – effects related). Operational analysis can support this process with various tools and a forecast of the situation is based on the findings [4].

3. DECISION SUPPORT IN ASYMMETRIC OPERATIONS

Decision is one of the most significant activities, which are accomplished by organization managers, is sometimes comprehended as a specific core control. Some authors distinguish so-called consecutively managerial functions (planning, organization, selection and worker layout, people management and control), that are realized in a certain temporal sequence and continuous managerial functions (enterprise of the analysis, decision and communication), that are intersected with the consecutive managerial functions. Decision is a real integral element of the consecutive managerial function. The decision is applied during the planning, because the core of planning process is created by decision processes.

The meaning of the planning is applied in the quality and results of this process, primarily strategic decision process, take place on the highest levels of the command and control, influence basic way of operation effectiveness and future prosperity of the organization. Bad decision can be one of the important causes of failure. The core of decision process is the correct adoption of derived decision.

It is obvious, that decision making should be the most effective from the very beginning. Could it be reduced only to the conscious, rational? The Intuitive, even the routine practices are based on know-how decision terminal and on their inference. Their mechanism application is strongly individual, it is not possible to generalize, it is close to instinct activity and it could not be turned down as irrational. The conclusion is that not only know-how by itself is hidden in the intuition, but also generational know-how may be actually linked with genetic heredity. They are the assumption, starting point and sign of individuality and for this reason they are the foremost methodize for each commander. Nowadays, the science does not know the examination which methodizes our subconscious reaction. The science is focused on willful, programming and rational decision. Computing techniques development and

primarily spread of personal computing leads to meaningful grow in utilizing these tools to support solution decision problem, also in warfare.

Decision making process essence is created by mutually dependent and connected activities, that are may be divided into certain elements, that are themselves indicated as stage (phase) of decision process. The Decision process is then gradual row of activities or phases, which accomplishment leads to effective problem solution (decision). These phases create structure of decision process in gradualness. Even with the use of decision making process support systems, the municipal model of decision process, which is supplemented by some additional stages, is preserved (Fig. 3).

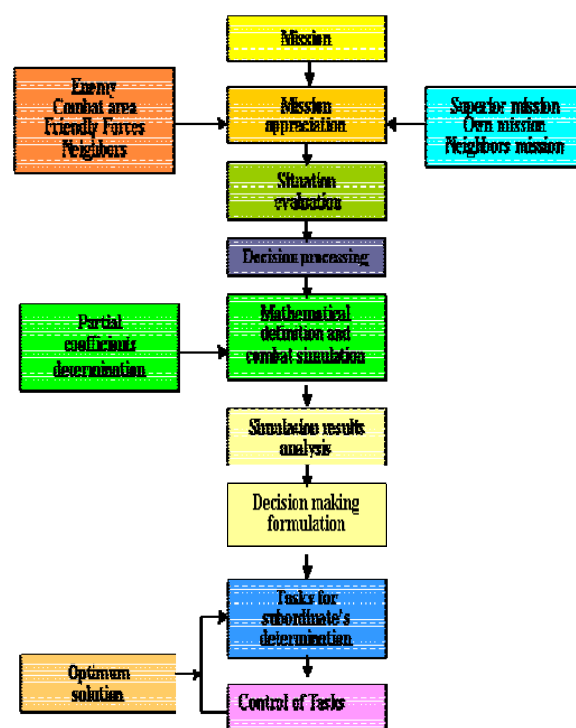


Fig. 3 Algorithm of decision making process

In a long term at the Military Academy of General M. R. Stefanik while dealing with the problems connected with the problems connected with the military sphere, our attention is focused on the application of decision making process. The systems, which support a decision making process, show how interaction character of computing systems consisting by model, programmatic and information security is applied. These systems

help managers to find the way of problem solutions and decision accomplishment activities.

Technical base of support decision system are generally personal computers connected to computer networks. Support decision systems are appropriate in the cases, when solution decision problems can be effectively supported by mathematical model application, sometimes relatively complicated, or when it concerns processing extensive files with exploitation model techniques. The shock effect near their creation is characteristics for asymmetric operations even in case we are followed by growing danger factor. This reality is further highlighting that generally we do not have enough detailed information, where from and when the crises situation could come. There is also a factor of further giant grow activity rate and their big heterogeneity, threat of the important interests of society expressed directly or vicariously, activities under stress and in the press of time, violation exerted operation processes and decision processes and their compulsory special treatment activities, decision without decision detailed analyses and other circumstances.

fulfill the aim and task of commander. The aim must be achieved by superiority in decision, condition information superiority, when it is susceptible for faster planning, superior decision and decisive effects operation.

Conditions achievement superiority in decision is development and implementation of conception operation nourishment, computing technology and informative network. These conception allow to accomplish the operations through complex, common and purposeful using of Command, Communication, Computer, Information and Intelligence system-C4I2 by digitizing form and cross-linked disposition forces on maximize effects in the real time operation up to the weapons and soldier level.

4. THE ALGORITHM OF AIR COMBAT SIMULATION

We can analyze combat possibilities by using of mathematical models and also by preparation of military staff and commanders for a real battle.

Decision making process usually starts with the clarification of assigned mission and evaluation of situation (Fig. 3). On the basis of clarification mission and results from the evaluation of situation the mission is defined. The goal is analyzed and clarified, the possibility of its accomplishment is determined. The stated and clarified goal creates the basis for the next decision. It is continued with the admission of the decision and its delivery to the subordinates.

Modern computer technology brings a new dimension into the decision making process. Nowadays the commandant and his staff dispose of sufficient theoretical knowledge, practical experience, creativity and initiative, they suffice for the admission of optimal decisions. The mathematical methods of the operational analysis, combat activities simulations with using of efficient computer technology are used for optimal using of Air Defence units (Fig. 4).

It is possible to divide the whole process of air combat simulation into several separate stages, which characterize the simulation of partial activities:

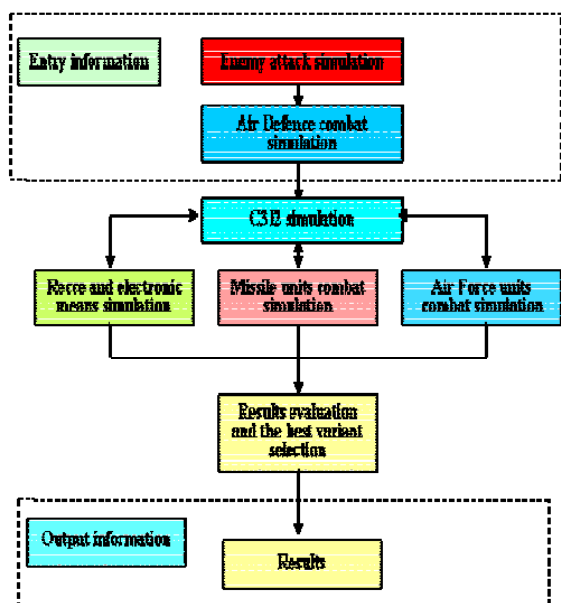


Fig. 4 Air Combat process scheme

At present effective command and control in asymmetry battlefield considers being the one of critical factor, which is able to help to

- assumed air enemy activity;
- targets detection by reconnaissance means;
- decision making process in the C3I2 system;
- Air Force combat;
- missile units combat;
- coordination between missile units and Air Forces;
- air combat results evaluation and the best variant selection.

The air combat model is the model of competition of two sides, where one side is presented by the Enemy Forces and the other one by Air Defence (Fig. 5).

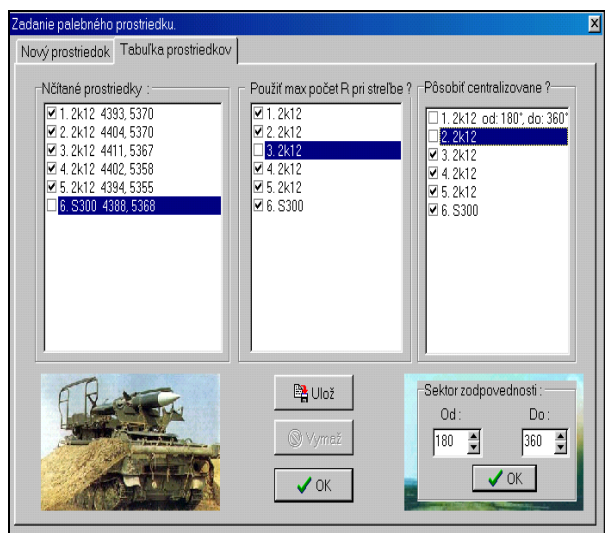


Fig. 5 Entry information Air Defence Missile System

The theory of probability, theory of statistic experiments, theory of bulk service, the rules of simulation and system access were used in the model assembling, and other methods enabling to arrange the model, which reflects the main principles and the logic of air combat.

It is possible to prepare the model of Enemy Forces attack in several alternatives, which characterize the basic assumed alternatives of the attack at the defended areas and places. For simulation of air attack it is necessary to put in entry data the assumed number and density of air targets performing from individual lines, assumed perceptual air targets divided into the vertical level and assumed way of reprisal activity to our Air Defence.

Air Defence entry data are prepared in a similar way. There are coordinates of position of reconnaissance units and the type of its equipment coordinates of position of missile units, the type of its equipment, the missile supply and also the Air Force.

In the first stage air situation is simulated with regard to the possibilities of air targets identification from individual positions with respect of the particular terrain, man oeuvre possibilities and jamming by Enemy Forces.

5. THE MATHEMATICAL MODEL OF AIR COMBAT SIMULATION

The quality of the air situation information is evaluated by the probability of the right task fulfillment supported by the reconnaissance system.

In the case of the evaluation of the individual subsystems (missile units, Air Force) portion on the effectiveness of the whole air defence system, it is suitable to choose the coefficient of system effectiveness that way as it would be possible to tie simply also with the coefficients of effectiveness of the individual subsystems. This is possible to accomplish through the mathematical chance of number of destroyed air targets. On the basis of the above mentioned, the coefficient of effectiveness of air defence system was selected as the basic coefficient [5]:

$$E_{AD} = \frac{M_C}{N_C} \quad (01)$$

Where: M_C - mathematical chance of number of destroyed air targets; N_C - number of air targets in the strike.

Mathematical chance of number of the destroyed targets is determined in dependence on the quality of the reconnaissance system, affectivity of C3I2 system, on the possibility of the enemy to destroy the missile units and Air Forces. The mathematical chance of the number of destroyed air targets by the missile units and Air Forces can be simply expressed as [5]:

$$M_{CMU} = \sum_{j=1}^N \left[1 - \prod_{i=1}^I \left(1 - P_{MU} \cdot P_F \cdot P_D \right) \right] j \quad (02)$$

$$M_{CAF} = \sum_{j=1}^N \left[1 - \prod_{i=1}^I (1 - P_{AF} \cdot P_F \cdot P_D)^i \right] j \quad (03)$$

Where: P_{MU} is the probability of the correct information for missile units; P_{AF} - probability of the correct information for Air Forces, P_F - probability of fire realization by missile units and Air Forces; P_D - probability of target destroying by one fire; I - number of fire to the target; J - number of lines in the enemy strike.

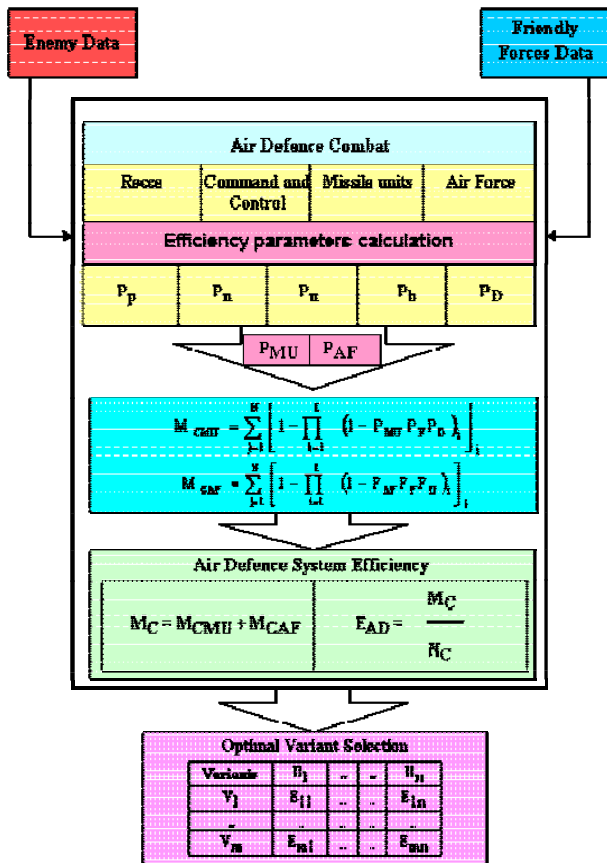


Fig. 6 Model of air Combat Conduct

The air combat is simulated in the concrete situation. In simulation we used the quality reconnaissance information, the engagement zone, the number of serviceable missiles in the missile unit positions, the arrival time of air targets to the engagement zone, the parameters of air targets act.

On the basis of the entry data we can determine the arrival time of the air targets to the engagement zone and to synchronize the lines according to the arrival time.

The Air Force combat is simulated analogically, considering the time and space factors.

It is assumed that the Air Force will be used out of the missile unit's engagement zone. We also have to take into the air combat simulation the action of the enemy against Air Defence.

Those means that are destroyed will not participate in the next air combat circle. This reality shows the probability of targets destroying and then subsequently, in the mathematical chance of the number of destroyed air targets.

The simulation results can be displayed for single Recce and Electronic systems, Air Defence Missile Systems (Fig. 7) and Air Force Fighters or to all fire systems too. For example for each target, on which Air Defence Rocket system operates, the distance of missile's blastoff (green color) and the distance at which it was destroyed by fire (red color) will be displayed. If the target wasn't destroyed, that fact will be displayed, too (blue color).

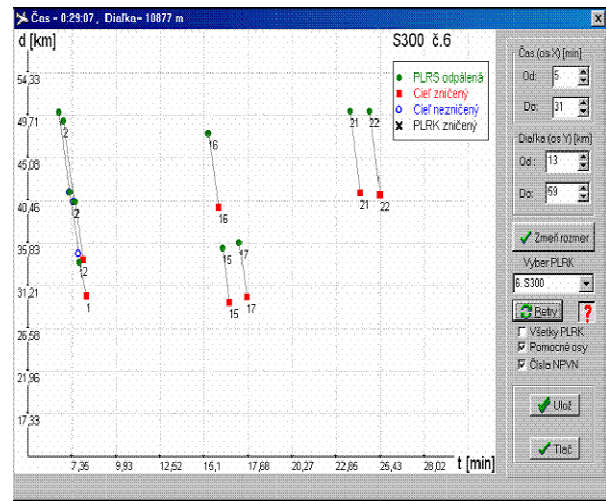


Fig. 7 Output information for Air Defence Missile System

6. CONCLUSIONS

The coefficient of the effectiveness of the air defence system is determined for every variant of air defence system and variant of enemy's attack. The effectiveness coefficients are registered in the matrix.

We obtain the optimum variant of organization of the air defence system by the analysis of the matrix of effectiveness coefficients; where the selection of the optimal

variant is executed with the use of mathematical methods of game theory.

The air combat simulation program for personal computers was processed on the basis of the mentioned algorithm. It is possible to use the model for optimization of decision making process on the air defence reconstruction.

The main responsibility for the particular decision is always up to the commander, who can't be replaced even by the best algorithm, program or computer.

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THE CHARACTERISTICS OF TERROR-THREAT ON THE SEAS

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***Abstract:** Some decades ago about piracy the romanticism of the picaresque novels occurred to the central-europeans. We already know that the modern-age piracy threatens the safety of the shipping and the trade. The terrorism also may mean a serious danger on the seas. The pirates and the terrorists may threaten the liners and the cargo ships equally. The lecture deals with the geographical definition of piracy and the terrorism on the world's seas and oceans. It analyses those safety risks and dangers. The research expands on presenting the identities and distinctnesses of the piracy and the terrorism. The lecturer analyses the experiences of the attacks until now, and the possible methods of defending against them and its devices.*

***Keywords:** sea terrorism, piracy.*

1. INTRODUCTION

Acquiring and holding the command of the seas – it was a highly important strategic and geopolitical issue already at the ancient times. There are numerous examples where the Great Powers lose wars because the lack of the naval control over the seas. The command of the seas – that's why the British Empire could enforce the so called "Last Fight" theory. The security of the sea transport is significant nowadays too. The countries of the World have to cope with challenges like the terrorism on the seas or the continually increasing piracy. From an economic aspect the security of the seas was never so significant problem than in the age of globalization. Over and above this problem is present not only in economic point of view but in the aspect of production process too. Nowadays the bulk of energy resources, raw materials and large scale of parts are transported on the seas, that's why the security of the seas is a strategic social and economical issue on the world.

2. TERROR THREAT OF PASSENGER SHIPS

The terror attacks against passenger ships are not too frequent. This is because of the

structure of these vehicles. Though it is easier to get up to the vehicles in the ports than to the airplanes on airports, but acquiring and maintaining full control over the ships is a really hard task from the point of view of the attackers. The hardness is derived from the relatively much closed working areas and passenger cabins that are cannot be fully controlled. Over and above these ships are built such a way that the open passenger-areas neither consist of one continuous area. By the way these structural characteristics are also making organization and execution of hostage saving actions more difficult at a hostage-taking terror attack.

In the history of modern-age terrorism the Archille Lauro case is cannot be eluded at the discussion of attacks committed on the seas. On 7th October 1985 Palestine terrorists are possessed the holiday liner Archille Lauro, which was fly under Italian flag, on the Mediterranean Sea. The terrorists took the control over the vehicle shortly afterwards when it left the port of Alexandria and made its way towards Port Said. The attackers demanded to set free 50 of their associates who were imprisoned in Israel and they threatened that if this request does not come true then they will set off the ship. After the terror attack there was confusion related to the

solution and the Italian authorities are informed that they do not know anything about the exact position of the ship since it left the Egyptian territorial waters. It neither was possible to know the number of passengers aboard. Originally there were 750 of passengers and 350 of the crew when the ship ran out of the Port of Genoa but a considerable number of tourists went ashore in Alexandria for sightseeing and – in accordance to the preliminary program – they would get on board again in Port Said.

There was a dramatic turn in this case on 9th October when the terrorists – who were keeping 750 of passengers and 350 of crew under restraint – killed the American Leon Klinghoffer 69, who was bound to wheelchair because of his illness. His body was thrown to the sea together with his wheelchair. Fortunately the attackers did not continue the slaughter and – presumably owing to the background deals and the prospective serious sanctions – they set their hostages free in Port Said on 10th October 1985. The Egyptian authorities wanted to transport the 4 committers to Tunisia to the headquarters of PLO with a Boeing 737 in answer to the request of Jasser Arafat. This attempt was unsuccessful because the F14 jet fighters that are took off from the aircraft carrier Saratoga forced down the airplane that transported the terrorists in Italy. In spite of the protestation of the American authorities the committers were released after relatively short imprisonment. Otherwise the attack was organized by Abu Abbas who was caught by the American Special Forces in Baghdad in April 2003.

3. THE DANGERS OF CARRIER SHIP'S DESTRUCTION

The bomber terror actions are endangering the security of warships too. The case of USS Cole is a good example. The Cole – the destroyer of the US Navy – suffered a bombing attack in the Port of Aden, Jemen on 12th October 2000. As a consequence of this attack 17 seamen were killed and 30 wounded. The suicide bombers exploded more than 300 kg of explosive. The detonation knocked a 72 square metres hole on the hull of the ship.

Among others this terror action was successful because the naval ships are not built for such warfare. The terror action against Limburg demonstrates well that the attacks against ships could cause serious environmental catastrophes. The Limburg was blown up also in the Adeni Bay on 6th October 2002. As a consequence of the detonation 90000 barrels of oil poured into the water and it spread apart on a 45 mile sector.

The attacks against USS Cole and Limburg are symbolizing that how defenceless the ocean-liners are on the seas. The suicide bombers can approach the ships with fast boat in the ports or on the open waters and the bombs can be activated by the collision with the ships. We can get conclusions about the possible consequences from the cases of the USS Cole and the Limburg. It is nearly impossible to prevent such terror-actions. Those boats loaded with bombs can hit the hull of the ships like torpedoes. The risk of such actions has to be taken seriously even if there was not any example in the past few years.

4. SEA PIRACY AND TERRORISM

Sea piracy has already millennial traditions. It cannot be considered as romantic and harmless activity, especially not on South China Sea, Red Sea, in the Malaka pass (BERKI, 2008). Plunder of the seafarer cargo ships on these areas are potential source of income to the terrorist groups. Based on the ship owner claims the International Maritime Bureau in 2003 reported 445 attacks on sea, as a result of which 92 sailors lost his life. Based on these data we have to pay attention on piracy, because these attacks in 2003 were almost doubled compared to the previous year (LUFT G, A. KORIN 2004). On the world's seas the modern-age piracy started in years 1990 became getting worse. Increasing number of attacks draws the attention of international naval authorities and state officials to deal with sea robberies, start to make this threat under control.

The risk of the piracy not reduced in the previous five years so it is a must to manage continuously on governmental and international level.

5. PIRACY ON THE SEAS

According to the conceptual definition criteria of the terrorism, the fundamental criterion of the terrorist acts is a political objective throughout application of violence. It is not possible to relate this to the steadily increasing piracy in the area close to the Somalian coasts. It is necessary to treat the pirates similarly, than the terrorists because of the strategic significance of the endangered supply lines. True those political claims are not formulated there, but there is real threat on using them as a tool in the international terrorism. The common treatment of the piracy and terrorism is obvious, because of their character and danger.

In the second half of 2008 and in the first half of 2009 did not pass a week without news on the Somalian pirate attack. By checking the International Maritime Bureau's website we can see data and maps of the ICC Commercial Crime Services (CCS) that may shocking how dangerous to sail on Caribbean sea or near the coasts of Indonesia, Malaysia, Somalia, Guinea Bissau, Nigeria, Tanzania. International organizations opened a direct link to the effected organizations like shipping companies, staff of ships in order to warn them on danger (IMB Report 2009). Because of the cumulative danger of the piracy, the information from ICC Commercial Crime Services can be considered as an everyday tool.

Somalian pirates mean the greatest danger and the largest risk in Gulf of Aden and in the beachfront areas. According to the official data the number of the pirate attacks was doubled in this area from 2008. There were attacks against 60 ships until 2008 October. According to the announced official communications, the Somalian pirates committed altogether 111 attacks in 2008. From the 92 attacks in Adeni-bay, at least 19 of them happened in the east coasts of Somalia. (ICC Report, 2009).

Pirates specialized on kidnapping in order to ask ransom which can be measured in millions of dollars for the release of captured staff and passengers and for the restitution of ships and goods (MIDDLETON R., 2008).

Against a World Food Program the Somalian inhabitants cannot ensure their minimal life needs, the central government almost not exists since 1991, means the international efforts on solving the Somalian issue are rather not successful.

The whole country is in a chaos, as the state is not able to fight against the gangs specialized on piracy. The income of pirate groups was ransom which was paid for them from the robbed ships. Also the plunder means income for the well organized and equipped groups. Pirates are practically keep under control the distribution of the food and medical cargos in the area of the World Food Program, which is a further source of their income (ICG Report 2008). Of course not only the food-aid delivering ships are only in danger, but all the civil passengers and goods transporting ship.

They approach the goods transporting ships relatively easily on their quickly moving ships and boats. The robbers trained well on how to manage the ship robberies relatively quickly, how to keep the ships under control with their staff and how to direct these ships into safe harbors. In 2008 piracy reached such a level that NATO and international organizations could not keep themselves away from this issue. In 2008 October the Somalian pirates demanded ransom already for 26 ships and 250 persons (ICG Report 2008). Even UN Security Council dealt with the case. They sent more warships into the area in order to make sure safety of the sea traffic. According to the available data of the International Maritime Bureau, the UN, EU and NATO efforts cannot be considered successful. There is a need for more efficient appearance against the pirates that would include the destruction of their land bases. It is clearly visible on the Diagram 3 that the piracy means serious danger on the seas of the world. We have to cope with this phenomenon because there is piracy activity not only in Somalia. In a possible NATO-contribution in Africa the pirates could mean huge security risk both on the Atlantic and Indian Oceans.

A debate started among the specialists, whether it is allowed to discuss with the pirates or not. True that finding the solution

through negotiations is appropriate for the pirates because in this case their aims were partly attained.

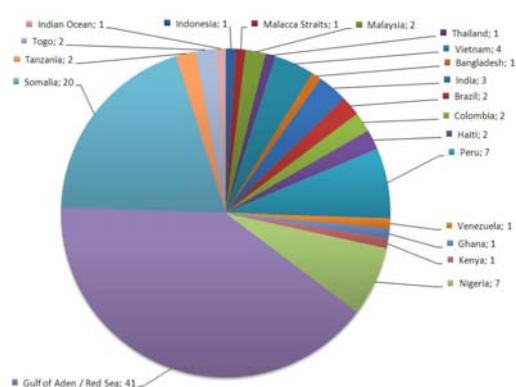


Fig. 1 Tendencies of pirate attacks in January - March 2009, Source: ICG Report 2009

On the other hand the release of the hostages is risky, altogether an attempt like this entailed complete success, when the captain of Maersk-Alabama, an American container ship managed to set free on 12 April 2009. It seems clear that the pirates increased their activity in 2008; their activity caused serious stops in the ship traffic. The rising insurances of shipping companies may raise the price of their tariff, which may reduce the competitiveness of the sea traffic. The activity of Somalian pirates caused serious economic damages to the shipping and insurance companies, to the commercial companies and already to the states who are participating in defense. According to experts it is not possible to force back the Somalian piracy without the restoration of the central state functions. The efforts on government restoration were rather unsuccessful, one after another miscarried in the last 18 years.

It is appear from the above that the pirates can potentially endanger the strategic military sea routes yet. It is practical to count on the risks of container terrorism in the future.

It is clearly visible on this map that there are several key points on the sea-routes of the world. Possession of these key points is strategic issue from economic and military point of views. The Suez and Panama Canals are outstandingly important but the Gibraltar, Hormus, Bosphorus and Malacca straights have similar importance too. These points have to

be passable freely and securely. It is not accidental that the piracy is gained strength near these areas.



Fig. 2: The main maritime routes of the World Source: Own work on the basis of the IMB Report 2008

It is also can be seen on the map that the pirates are endangering the maritime navigation at the coasts of South-Africa and Nigeria too. This is because of the frequent ship traffic on those seas, the geographical conditions - which are fortunate for the pirates - and the lack of security.

6. CONCLUSIONS

The risk of terror attacks on the seas has to be considered a serious problem. Present tendencies showing that terror threat level is lower in passenger transport than in the goods transports. In spite of that fact, we should not pass over the risk of terror attacks at this field either. Primarily the ferryboats are the potential victims of the terror attacks but - at waters that are endangered by piracy - the excursion yachts are possible targets too.

Fortunately such terror attacks are not too frequent but the experiences that are collected until now are showing that the risk is have to be considered seriously because of the general characteristics of terrorism. Unfortunately, about the piracy, which have been sketched out in this article, we cannot talk in conditional, it is to consider as a real danger nowadays too. Unavoidable question: how to defend us against pirates and terrorists. Definitely we have to have new methods and

equipments but the application of these methods and equipments could only be effective if they are accepted and applied on an international level. The air transport gives a good example where the number of terror actions against airplanes was forced back with international efforts and unified methods.

Nowadays the terror-threat and piracy are growing such measure which is demanding strict responses from the international organizations. In itself the naval patrol of the NATO members and other states is not enough for ceasing the danger in the endangered areas. There is a serious debate about the arming of the crew of merchant ships. According to some opinions this would solve the problem but this solution has serious security and legal worries. The international law strictly directs about the circumstances of the entry of an armed ship onto the waters of coastal states. If the governments of endangered states could prevent the piracy on its initial base, it would guarantee the freedom and security of maritime navigation.

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RISKS, VULNERABILITIES AND POSSIBLE THREATS OF THE EUROPEAN SECURITY ENVIRONMENT

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***Abstract:** Security is perceived as a dynamic process with a variable geometry, which imposes a permanently reference to the new types of threats from the external environment: terrorism, proliferation of mass destruction weapons, illegal migration, ethnic and religious conflicts and beyond. The risks, threats and dangers to the security of the European countries, implicitly of Romania, can be amplified by the existence of some vulnerabilities and dysfunctions.*

***Keywords:** risks, vulnerabilities, threats, European security, EU.*

1. VULNERABILITIES AND RISKS TO THE EUROPEAN SECURITY

The unprecedented period of peace and stability which Europe passes at the end of the XXth century and the beginning of the XXIst century is due to the existence of the European Union. The Union is the one who generated not only a high level of economic development on the continent, but also a new approach to security, founded on the peaceful resolution of disputes and on the multilateral international cooperation between common institutions. Certainly, a crucial role in the European security assurance was played by The United States of America, by the support conferred to the European integration and also by the security engagements to Europe, taken in the framework of NATO.

The unprecedented proliferation of terrorism, the alarming growth of mortality caused by terrorist acts, on the fond of the diversification of means and methods used by the terrorists to accomplish their stated objectives, determined the unprecedented reaction of the international community, which for the first time in the human history, acted loyal in the defense actions of the great values of humanity and democracy.

The consistency of Romania's full engagement policy to the efforts of the

international community for the resolution of the major problems of the humanity, acting like a responsible member of the North Atlantic Treaty and the EU, has assumed responsibilities and risks in this universal campaign against terrorism.

The globalization process will determine a more obvious growth of the economic interaction and interdependence level in the world's states, in the context of the stressed material and spiritual civilization transfer between the big powers and the less developed countries. In these conditions, the two characteristic sides of globalization, the interdependence between the national economies and the economic domination of the great powers, turn into the interest and under the strict control of the last. Even the globalization process refers especially to the economic sphere its effects have a determined connotation on the socio-cultural, political-military and of the global and regional security domains.

In this frame, it is obvious that between the phenomenon of globalization and European and Euro-Atlantic integration of the group of states from the Center and East of Europe exists a strong connection. Because of the lack of performance of their national economies and their reduced capability of adaptation, not being yet integrated in the new system, these

countries, suffer, in the initial phase, the negative consequences of globalization. As an effect, the European and Euro-Atlantic integration represents a goal which leads to social and economic prosperity, with all its positive implications upon national, regional and global security.

The geopolitical transitional process of the last few years, within many states from Central and South East Europe passed into the occidental influence area, was accompanied by a movement to east of the ex-border which had divided Europe in the Cold War.

The transitional process to capitalism determined a deepening of the economical disparity existent in the area and, on this fond, the conflicted latent state from the Balkan area was activated. By the enlargement to east of NATO in 1999 and next levels 2004, 2009, the security aspect exceeded the economical one. The crisis in Kosovo and the evolution of the situation from the ex-Yugoslavian space questioned the international community if in order to resolve the Balkan crisis, the two components (the security and economical one) should be approached together or individually. In this context, the launch of The Stability Pact for the South-east Europe represents a realist and benefic project, having on its base the fact that without economical stability and prosperity there will be no peace in the Balkan area. On long term this way is cheaper than the military way.

The military and political situation in the third millennium Europe is characterized by the following vulnerabilities:

- The maintenance of some high risk areas for the European security;
- The existence of some unresolved crisis which represent the threat of restarting some bloody conflicts (Kosovo, Cyprus, Bosnia and Herzegovina, part of the Republic of Moldavia, Caucasus);
- Ethnical and religious internal disputes which may generate conflicts (Macedonia, Serbia, Bosnia and Herzegovina);
- The internationalization of the ethnical and social internal disputes (Kosovo, France);
- The territorial or other nature claims which stress the relations between the involved states (Greece and Turkey, Greece and Macedonia,

Greece and Albania);

- The autonomist tendencies of some ethnical communities, the attempts to elaborate incriminatory normative acts with trans-border values, of some states;
- The difficulties met by some states in the transitional process;
- The existence of some ethnical political active minorities which consider themselves oppressed by the majority in the state.
- The insight and enlargement of Islamic fundamentalism, especially the radical one (Bosnia and Herzegovina, Kosovo, and even in the south east of Bulgaria);
- The influence of some high risk of instability areas (The Middle Orient, the Caucasus republics);
- The tendency of some states to become regional leaders (Greece, Turkey);
- The tendencies of The Russian Federation to rebuild the lost areas of influence after the end of the Cold War and the caption of Ukraine and the Republic of Moldavia in the Russian-Belarus Union;
- The growth of the Black Sea's importance in the process of redefining the new influence areas;
- The intensification of the non-military threats to the national security of the neighborhood states (organized crime, terrorism, illegal drugs and weapons traffic, illegal immigration);
- The maintenance of some risks or the apparition of others to the Balkan security is also revealed by the fact that in the last years, in the region, there were started conflicts and crises, which the international community proved to be incapable to prevent or resolve by political means. With this occasion the positive indisputable role of The US in Europe, as a main leader of NATO, and its main contribution as a coagulation factor of the political and military capabilities in order to distress and manage crisis, reestablish the normal state, was highlighted.

After 1990 and especially after 1998, the European Union gave a new impulse to the efforts of strengthening the security and defining the defense dimension on European level. The development of an external and commune security policy also included the

idea of defining a common defense policy, mentioned clearly in the Amsterdam Treaty. In the same time, The European Union showed much more preoccupation for the finalization of his own institutional internal reforms and for the resolution of the political construction debate which will define Europe's future, especially in the context of enlargement.

Beginning with the 1st of January 2007, the European Union defines itself as a union of 27 states, bringing together around 450 millions of people and producing round 25% from the global IBP. Becoming a global economic actor, the EU will also have to substantially participate to the global security assurance mechanism. However, it is important to mention the EU's implication to constitute a rapid reaction force, modularly organized, in more battle groups, which would put the bases to a new European common defense. After 1990, the new threats included a large scale of tensions and risks, and also a varied scale of their manifestation, like the following:

- The ethnical tensions;
- Traffic of drugs, radioactive substances and humans;
- The trans-border organized crime;
- The political instability of an area;
- The redistribution of some influence areas;
- The proliferation of the weak country entities, the so called "failed states", characterized by the corrupted and inefficient administration, incapable to offer its proper citizens the benefices associated to the common management of the public affairs;
- A new category of risks contains the non-traditional, asymmetrical ones, which may include armed and non-armed deliberate actions, having as goal the influence upon the national security by provoking direct or indirect consequences on the economical and social life of a country. Between the risks of this type are to be enumerated [1]:
 - the trans-national and international political terrorism, including its biological and electronic forms;
 - actions that may attempt to the security of the internal and international transport systems;
 - individual or collective actions of illegal access to the electronic systems;

- actions which mean to affect the international image of a country;
- the economical and financial aggression;
- the deliberate challenge of ecological catastrophes;
- At the origin of many conflicts were the inefficient leadership, the corruption, the power abuse, the weak institutions and the lack of responsibility which all eroded the credibility of the states and led to regional insecurity. From this point of view, nowadays many countries and regions risk to be caught into a spiral of conflict, insecurity and poverty.

From the pragmatic point of view, at the beginning of the XXIst century, the actors with a global impact on in the security domain are The USA, Europe, Russia, China, and Japan. An interesting point of view has Zbigniew Brzezinski; he considers that the essence of the world's new security structure is in the relationship between The USA and Eurasia (which includes Europe and the countries mentioned upwards) [2]. In the frame of this relationship, there can be identified two triangles of Eurasian power:

- The USA, Europe, Russia;
- The USA, China, Japan.

The most pertinently observation related to the two triangles of power is that, in each of them, one of the powers (Europe, Japan) clearly rely on the idea of international stability and security, while one of the other powers (China, Russia) remain opened and interested in the eventual geopolitical movements. From another point of view, it is considered that at the origins of "the new global split" is the tension developed between two different power "fields", founded on opposed organizational principals: on one side The USA, a supporter of single polarity, and on the other side the other major actors of the international scene – The European Union, Russia, China, Japan – supporters of multi-polarity [3].

2. THE GLOBAL CHALLENGES AND THE MAIN THREATS TO THE EU

Form Europe's point of view, the following threats are to be especially remarked: proliferation of mass destruction weapons,

terrorism and organized crime, cybernetic and energetic security, the climate changes.

The proliferation of mass destruction weapons guided as much as by the terrorists, as by the countries, was identified as “probably the biggest threat to the security of the EU”. This risk has grown in the last five years, putting pressure on the multilateral frame. While Libya dissolved its program related to the weapons of mass destruction (WMD), Iran and North Korea still have to win the trust of the international community. A possible rebirth of the civilian nuclear energy in the next decades gives also birth to some challenges to the non-proliferation system, if it is not accompanied by proper safety measures.

Also, supplementary efforts are necessary regarding different specific stuff, including: the EU’s support for a multilateral approach of the nuclear fuel’s cycle, the struggle against proliferation funding, bio-safety and bio-security measures, the stop of proliferation systems delivery, especially of the ballistic missiles. There should be opened the negotiations for a multilateral treaty which forbids the production of explosive material used for the nuclear weapons.

In Europe and in the entire world, terrorism remains a big threat to the means of living. There were attacks in Madrid and London, while others were avoided, and the groups formed in the internal scheme play a more important role on our continent. The organized crime continues to threaten the European societies, with the traffic in drugs, persons and weapons, together with the international cheat and money laundering.

From 2003, the EU has made progresses in approaching the both problems, taking supplementary measures in the interior of the Union, in the frame of The Program from Hague in 2004 and adopting, in 2005, a new strategy for the external dimension of justice and of the internal affairs. These have facilitated the development of the investigations on the trans-border level and the coordination of the consequences in justice.

In the frame of the EU, there have been taken many measures to protect the member societies against terrorism. It is necessary to consolidate the measures of coordination in

order to act in case of a major terrorist incident, especially if there are used chemical, radiological, nuclear and bio-terrorism materials, on the base of the existent provisions, like the plans of crisis management and the civil protection mechanism. There are necessary supplementary efforts regarding the stop of terrorism funding, and also an efficient and far-reaching European policy regarding the informational exchange, taking in consideration the proper protection on personal data.

Regarding the organized criminality, the existent partnerships from the neighborhood with the key-partners, as also the ones in the frame on UNO, should be deepened in order to approach the circulation of persons, the police and judicial cooperation.

The EU has highlighted the piracy as a new dimension of organized criminality. This is, also, a result of the country failure. The worldwide economy is based on the maritime ruts for 90% of the commercial exchanges. The piracy in the Indian Ocean and in the Aden Golf has transformed this fact in a pressing problem in the last months and has also affected the delivery of humanitarian assistance to Somalia. The EU reacted within ATLANTA, the first maritime mission PESA, in order to discourage the piracy in the area of the Somalia coasts, together with the affected countries and with other international actors, including NATO.

In 2005, The European Council implemented the EU Strategy in order to fight against the illegal accumulations and against the illegal traffic of small caliber and light weapons, as also against the proper ammunition.

In the context of its implementation, the EU supports an action program of UNO in this domain. The EU will continue to develop its fight against the threats of illegal SALW.

The EU supported the idea of elaborating an international treaty concerning the trade with weapons and decided to support the process which leads to its implementation. The EU is also an important donor in the anti-mine actions.

The modern economies rely very much on the critical infrastructure, including the

transport, the communications and the energy supply, but also on the internet. The EU strategy for a safe informational society, implemented in 2006, approaches the criminality based on the internet. However, the attacks against the private or governmental IT systems from the EU member states have conferred it a new dimension, the one of a possible economical, political and military weapon.

The concerns about energy dependence increased over the past five years. European production is declining which means that by 2030, up to 75% of its oil and gas necessary will have to be imported. They will be provided by a limited number of countries, many of which face threats to stability. Consequently the EU faces a number of challenges in security domain, which implies responsibility and solidarity of all Member States.

The answer must be a policy that combines internal and external dimensions, greater diversification of fuels, sources of supply, and transit routes is essential as they are and good governance, rule of law and investments in source countries. EU policy supports these goals through engagement with Central Asia, Caucasus and Africa, as well as Eastern Partnership and the Union for the Mediterranean. Energy is a major factor in relations between the EU and Russia. EU must address transit routes, including Turkey and Ukraine.

Since 2003 by the European Security Strategy has identified the implications of climate change on security domain, five years later, they became a more urgent issue. High Representative and the Commission submitted a report to the European Council where climate changes were described as a factor which multiplies the threats. Natural disasters, environmental degradation and competition for resources exacerbates conflicts, especially in situations of poverty and population growth, with humanitarian, medical, political and security consequences, including an increased migration.

Climate changes may also lead to disputes over trade routes, maritime areas and resources previously inaccessible.

3. CONCLUSIONS

The EU capacity of approaching the challenges increased in the last five years and has to continue to grow. The coherence has to consolidate by a better institutional coordination and a process of taking strategic decisions. The provisions of the Lisbon Treaty offer a frame in order to accomplish this.

We are in a globalized world, which determines a series of positive, but also negative effects upon the human security, which cannot be individually analyzed, but in the frame of a worldwide system of relationships and interdependencies. The economical and financial crisis which the world passes nowadays is another proof which demonstrates that within the globalization the world has become more complex and interdependent. This destabilized the developed economies, but also the economies in progress.

One of the major effects of the actual crisis is the decreasing of economy growth in the majority of the affected states. The reduced economic increase will put pressure on the standards of living, especially in the EU poor states. The importance of the proper funding and of the amelioration's orientation to the social protection systems in these circumstances takes a bigger significance.

The worldwide financial crisis which affects us nowadays may turn into a big vulnerability to the European and world security. Europe will reply to this new challenges, like it has done by now.

Basing on a unique range of instruments, the EU contributes to a safer world. UE has worked to build security for people by reducing poverty and inequality, promoting good governance and human rights, supporting development and combating the causes of conflict and uncertainty. EU remains the largest donor to countries in need. Requires a long-term commitment to stabilization.

Lasting solutions to conflicts should gather all the regional actors that have that common stake peace. Sovereign governments must assume responsibility for the consequences of their actions and have a common responsibility to protect populations from genocide, war

crimes, ethnic cleansing and crimes against humanity. Global Europe must lead the process of renewal of the multilateral order. UN is in the center of the international system. All the EU actions in security domain were related to UN goals. There is a unique opportunity to renew the multilateralism, working with USA and partners around the world.

Member is currently no single issue of security. Now happens frequently that individuals and institutions to feel unsure about many aspects. These individuals and these institutions were part of the enlarged security agenda and the process of internationalization of security characterized through a high interconnectivity between regions and sectors.

The analysis of risks and threats to the human security led to a new perception of the security state and to a new orientation in the defense domain.

The need of action integrated against these risks and threats has become a necessity. Romania, like other countries in Europe, understood that in the actual conditions of the international environment given by the complexity and the fluidity of the political and strategic environment, can assure itself the security "by the integration of the personal effort in the actions led by the European and Euro-Atlantic security organizations".

Nowadays, it persists with a series of important vulnerabilities which affect our security, over which overlaps the emphasis of some risk phenomenon, generated by the widening of terrorism, of traffic connections and organized crime, but also by the persistence of an interstate rivalry with direct influence upon the national interest.

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CYBER – TERRORISM, AN INSTABILITY GLOBAL SOURCE

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Abstract: *This paper will address what the risks and possibilities are of combining terrorism and computers. Within this context, it became more and more obvious the necessity that each and every state should use all resources offered by the common security systems, in order to be able to deal with attacks that can't be solved in a traditional way. The modern intelligence and communications technologies play a crucial part in the evolution of the virtual terrorism threat. The internet, which is a safe, permanent and approachable space, serves all means and terrorist actions: from the digital loss, propaganda, found rising to the recruiting, the coordination of actions and computerised attacks. It is important to look at the background of cyber terrorism, what some organizations or individuals are doing to protect themselves and others, and what the international community is doing to help fight cyber terrorism. Tomorrow's terrorist may be able to do more damage with a keyboard than with a bomb.*

Keywords: *cyber security, cyber attack, cyber terrorism, cyber defence.*

1. INTRODUCTION

A state's security depends upon its capacity to survive the international system. Nowadays, as the worlds interferences multiply and as the economic and financial crisis strike all countries as a tsunami, the security matter became more than just a way to prevent wars that depends upon economical, technological, demographical and ecological aspects [1]. The terrorism phenomenon is still considered a severe and ever growing threat that requires a complex answer. Within this context, cyber attacks are considered to be a part of IT crime. But it is most likely that in a short while they will come to represent a way of conducting wars based on the Internet.

Computers and the internet are becoming an essential part of our life. They are being used by individuals and societies to make their life easier. They use them for storing information, processing data, sending and receiving messages, communications, controlling machines, typing, editing, designing, drawing and all aspects of life.

The force of this kind of war will continue to rise because the economies, the

governments and the communities remove the so called „digital division” and those who use the Internet will become more and more vulnerable to cyber attacks.

The majority of the world's states invest billion of dollars in on-line attacks that are regard information in all areas (politics, diplomacy, economy, defence, culture, science, and so on). A cyber cold war at a global scale could be the most severe threat to the security in the next decade.

Cyber terrorism and the war in the cyber space are no longer fiction. In this area NATO remains involved in the efforts to strengthen the defence of the IT systems which are „the key” of the Alliance against cyber attacks as well as the concern to develop new ways of defence against cyber attacks and way to strengthen the connections between NATO and national authorities (Declaration of NATO, 2008, point 47).

2. MEANS OF THE CYBER ATTACK

The development without any precedent of the structures and quantities of information and the unlimited ways to transmit, stock,

display and distribute these information have determined a relocation of the actions off the military field to the Internet, which is the main battle field in cyber space.

The cyber attack has the potential to revolutionize conflicts:

- the ability to expand the defence actions franchise;
- the cover-up that is measured from a geographical point of view;
- the opportunity to ensure anonymity;
- the facility of proliferation;
- the impact upon “e-ready” targets.

Therefore, in the cyber attack, the informational infrastructure is the environment, the target and also a mean of battle [2].

The weapons and techniques of the cybernetic war are numerous and inventive means. Among these the most used [3] are the following:

- *The malicious software* - which represents a common threat that uses the data systems products as weapon against specific targets in order to obtain advantages through the breach of IT systems and blocking of the gravel unit and communications that ensure the well being of national decisional centres. Through this method the attackers are able to draw, alter, destroy or redirect some main software components in order to ensure unauthorized access to base data and to steal or destroy important information by also blocking the access of authorized users to the important sources of information.

Malicious software incorporates a small variation number of smaller programs that are able to act different from a virtual point of view [4] such as: viruses, IT worms, Trojan horses, logic bombs. Usually users are not aware of the cyber attack until the point when they realise its consequences.

The first fighters in the cyber space are considered to be the hackers. They are persons (criminals) that deliberately and without any authorization access files and programs causing significant damages. The hackers activity combined with the phrakers activity (that uses technology in order to attack the communication networks and to suffocate them with fake calls) leads to a general

alteration of the informational systems, that is difficult to discover and requires a significant amount of time in order to be rebuild.

The main indexes that prove the presence of the malicious software are: frequent blockage and crash of the data base systems and networks, loosing important data by sudden disappearance of files, slow or forbidden access to the internal memory of the computers, the alteration of the content o basic data, the artificial bombing of the e-mail subscribers with fake messages sent automatically.

- *The theft and destruction of the information from the data bases and from the networks which carry data* is a main action of hackers, with a significant influence upon the informational and decisional processes.

- *The denial or the reduction of the possibilities that the services operate properly within the IT system* - determines important delays in broadcasting the information and also a lower level of confidence of the users of the network. This appears mainly when there are several external connections of the computer networks which can't be efficiently controlled through software.

- *The semantic attack* of information is performed with the purpose to achieve the informatics handle in order to distract the attention of the person being attacked toward another target, which is different from the real target. The functionality of a system under semantic attack is not disturbed and the victim considers that the system works properly.

- *The technical attack* takes place in the cyberspace in order to prevent or to call off the hardware's defence mechanisms, the computers software and the computer networks.

- *The cryptographic attack* upon the IT systems by breaking the cryptographic systems is an important component of the cyber attack. The cryptographic algorithms used by the automatically cryptographic equipments are the only ones that ensure protection against this kind of attack.

The main purpose of using these weapons is to destroy or neutralize the opponent's informational infrastructure, by exploiting the physical vulnerabilities, the hardware,

software, data's and information management.

The best actual ways to prevent cyber attacks and to maintain the functionality of the IT systems should be based upon standard procedures such as:

- the permanent bringing up to date of the IT systems and of the software products;
- strong password politics should become compulsory and also should be applied by all IT systems users;
- the IT systems should be blocked when they are not used for a certain period of time;
- all services that are not necessary should be deactivated;
- the software and anti-virus programs should be installed and activated regularly and brought up to date periodically;
- the anti-spy ware systems (IDS) and fire-walls should be at all times used by the IT systems [5].

The development without any precedent of the structures and quantities of information and the unlimited ways to transmit, stock, display and distribute these information have determined a relocation of the actions off the military field to the Internet, which is the main battle field in cyber space.

3. NOTABLE INCIDENTS OF CYBER TERRORISM

Cyber terrorism can have a serious large-scale influence on significant numbers of people. It can weaken countries' economy greatly, thereby stripping it of its resources and making it more vulnerable to military attack.

In 1998, ethnic Tamil guerrillas swamped Sri Lankan embassies with 800 e-mails a day over a two-week period. The messages read "We are the Internet Black Tigers and we're doing this to disrupt your communications." Intelligence authorities characterized it as the first known attack by terrorists against a country's computer systems.

During the Kosovo conflict in 1999, NATO computers were blasted with e-mail bombs and hit with denial-of-service attacks by activists protesting the NATO bombings. In addition, businesses, public organizations and academic institutes received highly politicized virus-laden e-mails from a range of Eastern

European countries, according to reports. Web defacements were also common.

Another incident of cyber terrorists at work was when crackers in Romania illegally gained access to the computers controlling the life support systems at an Antarctic research station, endangering the 58 scientists involved.

More recently, in May 2007 Estonia was subjected to a mass cyber attack by hackers inside the Russian Federation which some evidence suggests was coordinated by the Russian government, though Russian officials deny any knowledge of this. The attack was apparently in response to the removal of a Russian World War II war memorial from downtown Tallinn. This attack was a distributed denial of service attack in which selected sites were bombarded with traffic in order to force them offline. NATO's officials acknowledged that such attacks should be prevented by developing different techniques and procedures in order to be able to respond in an equal manner.

As the "Financial Times" stated, in June 2007 "the most successful cyber attack on the US took place". Sources of the Pentagon claim that Chinese hackers succeeded to break the National Defence's computer networks.

McAfee's IT security report in 2007 stated that at least 120 states from all over the world are working to develop methods of maliciously using the Internet, in order to influence the financial markets or to attack government's or military IT networks. USA are a common target of these kinds of attacks, meanwhile the main attacker is china, followed by Russia.

4. A FEW ANSWERS TO CYBER SECURITY

Growing dependence on information and communication technology and increasing interconnection of critical infrastructures has made a secure cyberspace essential to the very functioning of a modern society.

Cyber security needs to be an intrinsic part of any states national security considerations as well the international community needs to systematically address this issue and an internationally integrated and harmonized approach is a viable option for national

authorities and the international community to ensure long-term and sustainable cyber security.

4.1. NATO's abilities to ensure the cyber security. NATO defines cyber terrorism (MC 0571, NATO Cyber Defence Concept, 23 Apr. 2008) as “a cyber attack using or exploiting computer or communication networks to cause sufficient destruction or disruption to generate fear or to intimidate a society into an ideological goal”.

The unconventional threats urged NATO to face a real challenge and to prove its capacity to reinvent itself on an ideological level and also on an operational level.

NATO has taken steps to protect its communication and information systems against attacks or illegal access. One of these is *the common policy on cyber defence*. This new policy establishes the basic principles and provides direction to NATO's civil and military bodies in order to ensure a common and coordinated approach to cyber defence and any response to cyber attacks. It is also contains recommendations for the members of the Alliance on the protection of their national systems [6].

In 2008, the NATO Policy on Cyber Defence was approved and NATO established a *NATO Cyber Defence Management Authority (CDMA)*. The NATO CDMA initiates and coordinates immediate and effective cyber defence actions.

From institutional point of view, with the assistance of the NATO C3 Agency and the NATO CIS Services Agency, NATO has established a *NATO Computer Incident Response Capability (NCIRC)*, providing intrusion detection and response capabilities, malicious code prevention, incident handling, computer forensics, vulnerability assessment, and security configuration support for NATO.

NATO is working to strengthen its relationships with the CIRCs of NATO member nations. Collaborative cyber intelligence sharing is key to broadening and strengthening NATO's capabilities in this area¹.

In response to cyber attacks on Estonia 2007 and Georgia 2008, NATO offered the assistance of its cyber defence and also established a *Cooperative Cyber Defence Centre of Excellence (CCD COE)*, hosted by Estonia. The mission of the CCD COE is to enhance the cooperative cyber defence capability of NATO in order to support NATO's military transformation and sponsoring nations and other customers thus improving the Alliance's interoperability in the field of cooperative cyber defence. The centre “will help NATO defy and successfully counter the threats in this area”, said General James Mattis, NATO's Supreme Allied Commander Transformation [7].

International coordination of cyber incidents is still a complex and difficult challenge. NATO has responded by CCD COE and by conducting periodic cyber defence exercises. While NATO's focus is on defending NATO's own infrastructure against cyber attacks, NATO can provide assistance to NATO nations upon request as well.

It is obvious that the battle against cyber terrorism requires a world-wide effort. The saying “there are no borders in cyberspace” is more real as ever. NATO made important progresses regarding the fight against cyber attacks, representing the most important organisation in this area. The perpetual cooperation between NATO members, state partners of NATO as well as with international organizations is of the essence in order to manage this kind of measures in an efficient manner.

4.2. EU's abilities to ensure the cyber security. 10 years since EU failed to ensure the energetical security of the continent, another danger threatens EU's ability: the cyber terrorism. Its destructions potential is obvious: everything from water and electric power to financial industries and public services depends on the internet. The right combination of malicious code, stolen or hacked passwords and a badly designed system could mean catastrophe.

¹ Brian Bottesini (who is a Principal Scientist and information assurance expert within the NATO

Consultation, Command and Control Agency) in “International Cooperation in the Fight Against Cyber Terrorism”.

EU's mission in the cyber security field should be understood looking at the whole picture, one in which the communication networks and the informational systems are important factors to the development of the society and to the economical growth, so this requires that the security of these areas should become a major demand, essential for the functionality of the Digital Economy.

For the purpose to intensify the opportunities of the EU, of EU state members and business communities, in order to prevent, manage and solve their cyber security problems the European Network and Information Security Agency was organized. (ENISA)².

In May 31, 2006 The IT Security Committee decided that ENISA should have a bigger role in the field of gathering data in order to manage security incidents, by developing a partnership based on trust with the state members (the Security).

Despite all efforts the agency remains an instrument that "in the short term is not going to become the European headquarters of defence against cyber attack" [8].

The international exchange of information is able to allow early warning regarding doubtful activities and the identification of the profile of some possible cyber attacks. In this respect few governments already begun to take measures in order to ensure their protection against threats that are common to the Internet Era, by founding-at a national level-The Computer Emergency Response Team (CERT).

Romania, member of both NATO and EU [9], has identified as risks and also threats to the national security the jeopardy of the citizen's and state's security information.

Therefore, since January 2007 it has initiated the forms in order to found RoCERT.

Thus, in March 2008, after the functional and structural transformation of the SRI took place, the National CYBERINT Centre was

founded [10]. It has the mission to ensure the means of prevention, protection, reaction and management of all consequences should cyber attacks happen. After almost 2 years since it was founded, the Centre offers the program according to which the institutions from the national security system that have responsibilities in this area collaborate and also offer the connexion with similar structures within NATO and EU.

4.3. Some suggestions. "I Believe Europe must do more for the security of communication networks" said The Information Society and Media commissioner Viviane Redding.

Currently there are no fool proof ways to protect a system. The completely secure system can never be accessed by anyone. Most of the militaries information is kept on machines with no outside connection as a form of prevention of cyber terrorism.

Two years after the cyber attacks from Estonia, NATO and EU and its member states are still wrestling with this issue.

So, in order to deal with the rising challenge of cyber security, I think the following suggestion should be taken into consideration:

1. A better international cooperation is the key to fight successfully against the cyber threats. Countries should found a private-public partnership in order to fight back cyber threats.

2. Countries should establish specialized Computer Emergency Response Teams (CERTs). Staff should be regularly trained according to the latest trends and developments in cyber security area.

3. Critical infrastructure protection should increasingly take into account potential cyber threats. The infrastructures are or are about to become a critical matter due to their vulnerability. Cyber threats aim at the infrastructures directly or aim at the systems and processes they are a part of [11].

4. Raising awareness and educating the individual Internet user is very important. Security is everyone's business and the human user remains the weakest link in terms of cyber security.

5. A clearer and more enforceable

² Formally, ENISA was founded as the European Parliament and the EU's Council approved The Common Regulation (EC) No 460/2004 at 10th of may 2004. The agency became operational in september 2005, after the redistribution from Bruxelles to Creet and after the Staff became functional.

legislation regarding cyber-crimes.

6. Actions such as statistics about the presence of the terrorism on line, recruiting, training, fighting back the ideologies of the terrorist organizations, finding out and cutting off the financial resources of the terrorist organizations should become a priority.

5. CONCLUSIONS

The probability that a cyber war could happen at any time is given by the two tendencies of: the rising vulnerability and of the easy execution of the attacks. On the short term they represent a growing threat regarding UE and NATO's state members from the point of view of ensuring the power of the lower levels actor and of the hostile governments. It remains to be seen if the cyber war will become just an instrument of state actors or if the lower level actors will maintain their ability to carry on this war against state's member's nations.

Information should be protected regardless of their shape. The development of politics and standards of security ensure a better understanding of the responsibilities of all those involved in the cyber security.

Identity protection and the lack of restrictions which are characteristics of the virtual space have potential in the globalization and the unpredictability level of the terrorism's phenomenon, giving each individual the opportunity to borrow and copy the radical ideological patterns along with the opportunity to interact with local or international virtual networks.

The confrontation with this new side of the terrorist threat lead the Alliance and the state members to adapt their efforts and strategies in a joined effort to anticipate violent actions and to develop the information exchange and the mechanism that allows the identification and elimination of the ways in which the Internet is

used for extreme terrorist purposes.

Currently there are no full proof ways to protect a system. The completely secure system can never be accessed by anyone. Most of the militaries classified information is kept on machines with no outside connection, as a form of prevention of cyber terrorism.

The international community is able to adapt to the new realities, to keep up to date and to discover new ways of action in order to ensure the security of its members.

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IMPROVING OF THE RECRUITMENT AND SELECTION OF MILITARY PERSONNEL

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Abstract: *This paper emphasizes that during the last period, practice in developed countries signals a logical economic penetration in all sectors of social life. In this context, military organization begins growing more compared to a company. Consequently, also in the army, any personnel policy is subject to labor market rules, agreeing to face the competition for attracting human resources.*

Keywords: *military marketing, recruitment, selection, military occupation, product, price, distribution, promotion.*

The recruitment of candidates for the military profession is currently registering in a new course based on a comprehensive unitary strategy of the human resources management in the Romanian Army.

In this new vision, the recruitment is the process of active search and attracting people from the labor market and educational market, people who are able and interested to join voluntarily to a military organization. An important feature of the recruitment for the military profession is that all media are considered for recruitment, but a „nuanced” importance is accorded to different potential suppliers of the candidates. So, only a concentration of recruitment to the market is most likely to produce lasting results.

Existing conditions on the educational and professional offer today’s market an extremely dynamic and varied market, with levels often more attractive and accessible to candidates, and the new development requirements of a modern army, led by themselves, the characteristics of the new system recruitment, as opposed to the old system, practiced within the army, as follows:

- Continuous pro-active search versus „passive standby” of the candidates, the profession and military career are „sold as a commodity”;
- Use of scientific methodologies and tools

versus empirical methods;

- Focus on quantity versus quality;
- Transparency and collaboration with civil environments, local communities versus rigidity and ignorance of their potential supportive;
- Diversification of media recruitment.

The activity of attracting candidates who meet the requirements / criteria for access to military educational institutions is carried out by specialized structures of the army. Executive structure of the new system is the Information-Recruitment Office, a structure established in each county and in Bucharest.

The recruitment structure operation starts from the concept of centralization principle and from the decentralization of execution. The structure of recruitment is a territorial structure, which acts semi independent, based on some specific guidelines set, so it needs a flexible planning and organizing, creativity, continuous training of recruiters in order to successfully deal with change and specific situations occurring continuously on the educational and professional offers market.

The recruitment structure, the recruiters have the responsibility to promote the military profession within the civil environments and to identify and attract the most gifted individuals in terms of skills and motivation for the military career. This is a public activity, and it

represents the first very important contact between Army representatives and potential candidates.

Recruitment environments are those environments which provide candidates for the direct pathway (it does not require a prior military training) and indirect pathway (military training is required for access) (Ghinea, 2002, p. 9):

- The educational institutions (schools, colleges, post-secondary schools, universities) are the main supplier of candidates. Schools are very different, their differences should be aware of the recruiters, to be individualized to act as a profile of that school;
- The military units (ranging in size and type; the types of candidates for this environment should be known by the recruiters-military recruitment and military employees under contract);
- The economic units, establishments and employment agencies and vocational training, etc.

The personnel employed in information-recruitment offices (recruiters) has been selected very carefully, starting from the performance criteria, experience and training in order to introduce in the system the most „gifted” people, since they develop a new type of activity at the interface with civil environments. This requires flexibility, ability to make decisions correctly and quickly, creativity and adaptability to change.

To ensure the quality of the recruitment process, various stages of development were completed and the following types of actions are undertaken:

- Annually, a clear criteria for recruitment targets is developed (such as general and specific types of branches and by candidates);
- Annually a recruitment plan is developed for each county, by type of branches and by candidates on a scientific basis (size of this plan is based on demographic indicators-age, gender, environment of origin-and educational-level school) thus it can relate, permanent recruitment needs of the military for each year, with specificity of each county;
- Viable recruitment tools were created/improved (contact form, interview report, medical records, membership

application, recommendations, etc.); these are accompanied by explanations for the application and interpretation of data. These tools allow the creation of a global image and as the candidate's goals and focus on qualitative aspects. Recruited staff can easily use these tools in achieving the relevant data about a candidate;

- An updated annual database of the candidates for military occupation was designed;
- In the first stage of implementing the new system of recruitment, two studies were conducted with the support of the Department of Social Investigations, which followed the collection of qualitative and quantitative data (types of motivation, attitude toward the military environment, compatibility with criteria recruitment) on certain categories of candidates „more sensitive” to the indirect pathway (military employees under contract and reduced military term). The studies are designed to provide opportunities for adjustment and correction of the methodologies used;
- Annually, it is doing research on „Socio-demographic profile and motivation of young people who have chosen a military career in recruitment ...”;
- Periodically, a specialization training of the recruited personnel is organized to ensure adequate preparation of this type of activity.

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When editing the articles which are to be published in the review some rules will be respected as follows: the whole paper must be written with no free space between lines using the Times New Roman CE; the margins of the text: Top – 28mm, Bottom – 20mm, Inside – 25mm, Outside – 20mm, Header – 18mm, Footer – 15mm, Mirror margins activated, Paper format A4 210X297)

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The title will be printed in Upper cases 14pt, bold, centred.

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Papers must be prefaced by a brief abstract in English up to 150 words. The text will be written in 11pt high, Italic, justified, left-right alignment.

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